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ABSTRACT

This document contains excerpts from material previously published by Australia's TAFE (Technical and Further Education) National Centre for Research and Development on the subjects of industry restructuring, the reasons for restructuring, revising curricula, and providing a service to business and industry. Its contents are "Industry Restructuring and TAFE: A Discussion Paper" (Hall, Hayton); "Training for Integrated Manufacturing: A Review of Recent Literature" (Hayton, Harun); "Translation of Labour Market Needs into Training Responses" (Hayton); "Training Needs Analysis" (Hayton, Clark, Hayes, Guthrie); "TAFE-Industry Partnership" (Hall); "Open Learning" (Hall); "Articulated Training: A Model for the Building Industry" (Wallace, Guthrie, Hayton); "The School of Hard Knocks" (Thomson); "Teaching the Social Implications of Technological Change" (Hall); "The Continuing Education Needs of Academic Staff: Full-time TAFE Lecturers" (Hall); "Marketing TAFE: Effective Public Relations and Marketing for the TAFE System" (Cutter, MacRae, Oliphant, Scott); and "Performance Indicators" (Guthrie). (CML)

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TAFE

TAFE NATIONAL CENTRE FOR RESEARCH AND DEVELOPMENT

INDUSTRY RESTRUCTURING: EXTRACTS FROM CENTRE PUBLICATIONS

Edited by William Hall

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INTRODUCTION

"Industry restructuring presents TAFE with its greatest ever challenge." So starts the booklet entitled Industry Restructuring and TAFE which is reproduced at the start of this publication. The challenge includes the following components:

- having a thorough understanding of what is meant by industry restructuring, and the reasons why restructuring is taking place;
- responding to the training needs arising from restructuring;
- revising curricula;
- satisfying the continuing education needs of teaching staff;
- providing a service to industry/commerce.

During the past two years the TAFE National Centre for Research and Development has published material which covers each of these components. This publication (which was prepared for a Centre workshop) provides extracts from that material and should be of use to those wanting to do industry restructuring background reading, especially as part of an in-service course. Details of references cited in the extracts may be obtained from the original publications.

The Centre's research in industry restructuring is continuing. To keep up-to-date with developments please consult TAFE Projects in Progress.

1. INDUSTRY RESTRUCTURING AND TAFE
William Hall and Geoff Hayton (1988)

This booklet was distributed widely throughout Australia. High demand led to a second printing. It provides a straightforward account of industry restructuring and discusses the implications of restructuring for TAFE courses, TAFE teachers and industrial training. It makes a special plea for continuing education programs which enable TAFE lecturers to update their technical/vocational knowledge and skills in their teaching areas, pointing out that there is an urgent need to provide ways in which teachers can keep abreast with technological change.

INDUSTRY RESTRUCTURING AND TAFE

A DISCUSSION PAPER

William Hall and Geoff Hayton

INTRODUCTION

Industry restructuring presents TAFE with its greatest ever challenge. There have been other challenges (and TAFE has successfully risen to them) but none has been on the present scale.

The purpose of this booklet is to provide a straightforward summary of industry restructuring and to encourage continuing discussion within TAFE colleges of some of the main issues arising from the restructuring challenge. There is actually time to prepare for this new challenge; but not much time. The next 3-5 years will be the crucial period. This booklet should help colleges to get ready. It does this by describing the nature of the challenge and then discussing some of the main implications for TAFE courses and TAFE teachers.

The challenge is not just TAFE's. It is also important that industry makes its preparations and so in the final section of the booklet we discuss implications for industry insofar as they impinge on TAFE.

One cautionary word: there is much more to TAFE than the provision of courses to deal with industry restructuring (extremely important though that is). It would be disastrous if all of the other important TAFE activities (including adult education, and social equity programmes) were to be neglected as a consequence of the new pressures.

1. WHAT IS INDUSTRY RESTRUCTURING?

Industry restructuring is the substantial changing of work structures across an industry through changes to industrial awards and informal agreements which allow new approaches to work organisation to be implemented within individual organisations.

Another definition of industry restructuring used by some commentators includes the increase in percentage employment in service industries at the expense of manufacturing. Although this booklet does not discuss this change specifically, the impact on TAFE facilities and staff is likely to be as considerable as the impact caused by changes to industry work practices.

Industry restructuring has already started. It is not unique to Australia. The forces behind the changes are worldwide and are irreversible. To understand industry restructuring the two major forces behind it need to be understood, namely:

- sophistication of world markets;
- new technology.

A discussion of both follows.

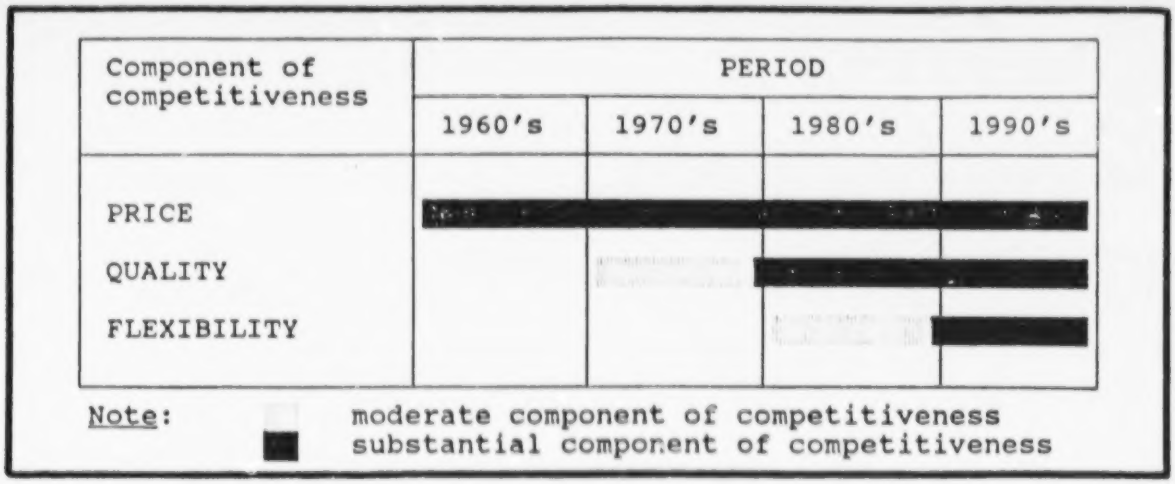
Sophistication of world markets

The predominant type of work organisation for most of the 20th Century involved a strict hierarchical structure with highly specialised work. Where machines replaced workers, the machines were specialised. The main aim was to reduce product cost.

Many experts have pointed out in recent years that there has been a move away from markets where price is the main component of competitiveness to customer-oriented markets where price, quality and flexibility are equally important components. Flexibility includes:

- the development of innovative products and services;
- fast responses to market demand;
- short lead times from order to delivery.

The broad trend towards greater emphasis on quality and flexibility in recent years is illustrated below. Naturally, the relative importance of each component of competitiveness will vary from product to product and from service to service.



New types of work organisation are required to achieve simultaneously: low prices, high quality and greater flexibility.

Integrated types of work organisation are based on some or all of the following approaches:

- flat management structure with few hierarchical levels;
- skill enhancement with a lower degree of specialisation;
- smallness of scale;
- teamwork where a small group of workers perform multiple functions.

Responsibility for key organisational goals such as efficiency, quality and flexibility are shared by all members of the team rather than left to specialists.

Many now believe that companies which integrate the various functions within the organisation into a single, well-coordinated whole unit are more likely to achieve world competitiveness in price, quality and flexibility[1].

New technology

In the past, new technology usually involved the replacement of people by a machine. Machines could be developed to perform the function faster and more reliably. However new technology has taken a different direction in recent years with the application of information technologies to achieve integration of operations and functions in the following ways:

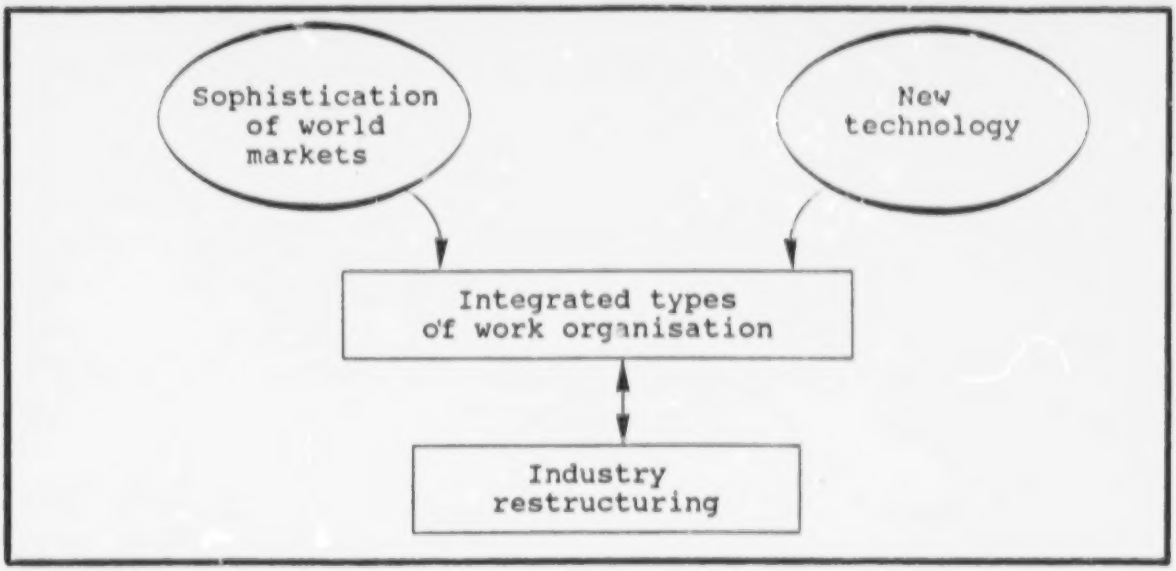
- the linking of two or more dedicated machines with respect to material flow and/or information flow;
- the consolidation of two or more operations in a programmable machine or robot;
- the linking of two or more functions, such as design and production[2].

In the early 1980s a debate raged between those who thought these new technologies would require a reduction in skills and eventually lead to the 'unmanned factory' and those who thought the new technologies would require an increase in skills and would emphasise the importance of the human contribution to industry. A considerable body of recent research has shown that both outcomes are possible but the latter outcome is thought by many to be more likely to provide industry competitiveness. In other words, companies can choose to introduce new technologies in two major ways but the way that emphasises a combination of high skill and new technology is believed by many to be superior[3].

The high skill/new technology option requires integrated types of work organisation to exploit its full potential. In manufacturing (in particular) there is not much advantage in integrating machines and operations without also integrating workers. The importance of integrating both machines and workers is becoming well understood in manufacturing industries and is referred to as CHIM (computer and human integrated manufacturing) or simply as *integrated manufacturing*.

Work organisation and industry restructuring

We have seen that to meet market demand for price, quality and flexibility, and to exploit fully new technology, many companies are starting to implement integrated types of work organisation. Such changes to work organisation are frequently linked to industry restructuring. The relationships between these are illustrated below.



Companies may move a small way towards integrated types of work organisation but soon come across barriers to change. The present structure of Australian industry is based on:

- mass production techniques;
- specialisation of machinery;
- specialisation of the skills of workers;
- segmentation of occupations.

This has resulted in a large number of trade occupations. There are fewer paraprofessional and professional occupations, but even at these occupational levels, boundaries between 'disciplines' are difficult to cross. This in turn has shaped the structure of Australia's industrial relations, unions, and education and training systems. Industrial awards are based on a large number of carefully defined occupational classifications. The union structure is mostly based on occupations rather than industries. Tertiary education institutions often have structures mostly based on occupations.

To achieve integrated types of work organisation, industry restructuring is occurring and this is likely to affect:

- industrial awards;
- the structure of unions;
- the educational system;
- accreditation and certification.

Integrated types of work organisation will lead to a new occupational structure in Australia. In the new occupational structure there will be fewer trade occupations, with each trade covering a broader band of skills. The boundaries between trades and between disciplines at the professional level will either be eliminated or be easier to cross. There will be fewer restrictions on individuals moving between occupational levels because of greater articulation between different educational qualifications.

In the new occupational structure, greater flexibility within each (broader) occupational classification is allowed, and occupational mobility by the crossing of one or more boundaries is easier and more likely. Easier crossing of boundaries is likely to occur through greater integration and articulation of vocational courses.

2. INDUSTRY RESTRUCTURING AND TAFE COURSES

Industry restructuring will have a major effect on TAFE course content and course structure. Courses preparing individuals for the new industry structure (of high skill, new technology and integrated work organisations) will need to develop the individual's abilities to:

- adapt to changes in technology;
- more readily transfer skills to new areas of specialisation;
- combine skills in two or more disciplines;
- readily accept and seek retraining at appropriate points throughout working life.

The new industry structure requires course content that provides for higher skill levels. There will need to be:

- greater emphasis on conceptual learning;
- greater emphasis on 'technological literacy', the social implications of technological change and quality concepts in primary, secondary and tertiary education;
- the development of 'learning to learn' skills;
- the development of a broader awareness of the industry and industry restructuring in vocational courses.

The keyword for appropriate course structures of the future is *flexibility*, and it has been suggested that this could be achieved more readily by a *modular* course structure with broad-based modules early in the course. Each module should be able to stand alone and be capable of being separately assessed. The structure should allow for multiskilling, multiple entry and exit points, and retraining.

This flexibility is only possible if:

- the length of the course (or period of study) is not considered a major criterion of learning success;
- courses specify the performance standards to be achieved (and the conditions under which performance is to be achieved);
- courses can be developed, approved, accredited and reaccredited quickly.

TAFE courses will need to allow for both horizontal mobility (e.g. between trades or subject disciplines) and vertical mobility (e.g. between job levels and between academic awards or institutions). Such flexibility could mean:

- course structures which allow a greater range of choices in combinations of subjects or modules, including cross-disciplinary combinations across traditional disciplines such as mechanical and electrical engineering (and this is already occurring);
- course structures which allow multiple entry and exit points and retraining;
- a restructuring of education towards administrative groups and courses based on industries rather than occupations;
- greater integration and articulation between educational institutions and between the educational sectors of secondary, TAFE, advanced education and University[4].

3. INDUSTRY RESTRUCTURING AND TAFE TEACHERS

Multiskilling, transferable skills, new technology, course flexibility, and product and service quality are the main agenda items for industry restructuring. How well prepared are TAFE teachers to deal with each of these?

Multiskilling

Most TAFE lecturers have themselves been 'monoskilled' trained. Even if time and money were available, changing the level and breadth of teachers' skills, on the large scale required and in the short period of time available, is not practicable. Therefore team-teaching offers one solution to the problem. (This teaching approach is not new.)

Team-teaching requires careful planning and skilful doing. Coordination of separate course components will not happen by chance. Therefore TAFE teachers will need to be trained in how to make their specialisations part of a larger and more broadly skilled whole. This training will be necessary for both course planning and course delivery. Management and teaching skills will be required; curricula will have to be restructured.

Transferable skills

Transferable skills across trades have been talked about for years, usually in abstract terms with little practical evidence being produced of transferability. What evidence exists seems to indicate that we must explicitly teach for transferability (it won't just happen of its own accord) and transferable skills must always be taught within the context of a trade using the examples of that trade. Transferable skills cannot be learned as abstract ideas.

What this means is that teachers will have to explain how, when and where a skill is likely to be transferable and to give practical examples of the transferability, otherwise transferability will not be seen by students and will certainly not be learned by them.

New technology

A recent Centre report[5] showed that there is an urgent need for continuing education programmes which enable TAFE lecturers to update their technical/vocational knowledge and skills in their teaching areas, and there is an urgent need to provide ways in which teachers can keep abreast with technological change. The research showed that over 90% of all TAFE colleges recognised these

as severe or important problems. *The urgency of finding ways to deal with these cannot be overemphasised.* A Centre report on TAFE/industry liaison provides some suggestions[6]. These include:

- industry owned equipment leased out-of-hours;
- industry owned equipment made available free out-of-hours;
- industry owned equipment lent on a short-term basis for 'real' work to be carried out;
- industry facilities used for teaching purposes with company staff as trainers;
- joint facilities, especially skills training centres and facilitator agencies;
- industry staff working in TAFE colleges on a paid or 'loan' basis.

There are already good examples of these.

Course flexibility and TAFE staff

Industry restructuring will lead to the need for worker retraining. It will usually be inappropriate for such people to start at day one of a formal course, and then go on to complete the whole of that course.

Unfortunately, the assumption made in most courses is that students should enrol by a fixed date, that they must have studied pre-requisite subjects, they must start to attend set classes at a particular time, must complete the course according to a rigid timetable, must undertake the whole course regardless of individual interests, and they must pass some formal assessment. Even external studies courses frequently impose some of these constraints.

Increasingly, students looking for retraining will want to be given a choice in

why they learn
what they learn
how they learn
where they learn

when they learn
who should help them
whether they should continue.

Consider one of these: the choice of *where* they learn. Students should only be expected to go to a college where learning cannot more appropriately take place elsewhere. Appropriate ways to deliver courses to suit client needs will have to be used. TAFE (through external studies) has much proven experience of this. This experience will need to be drawn upon by all teachers in all colleges.

If courses are to provide the kind of flexibility required by employers and by students, TAFE teachers and TAFE course designers will need to be trained in structuring courses so that multiple entry and multiple exit are possible, so that appropriate ways of delivering instruction are provided, and so that the four walls of a college are not regarded as sacrosanct.

Product and service quality

There are some golden threads which should be woven through all TAFE courses. Occupational health and safety is one; the social implications of technological change is another; the concept of quality is another. For industry restructuring, achieving product or service quality within industry is not just a golden thread - it is made of platinum!

Total quality management within industry must be an essential component of all training if industry restructuring is to succeed. Quality control is *not* sufficient and quality should *not* just be left to specialists. Everyone in industry should strive for continuous improvement by constantly seeking better ways. A Centre report suggests ways in which the concept of quality may be integrated into TAFE courses[7].

4. INDUSTRY RESTRUCTURING AND INDUSTRIAL TRAINING

TAFE is just one-half of the TAFE/industry partnership. If educational provision to deal with industry restructuring is to be effective, then the TAFE/industry partnership should be just that: a *partnership*.

There are very many excellent examples of the partnership and most of these examples are at the local (college) level. They have been developed over many years. These existing links should be used and strengthened when attempting to solve some of the industry restructuring training problems.

Recent Centre research[8] has shown that the over-riding impression of industrial training in Australia is that it is uncoordinated and *ad hoc*. Training is frequently not approached systematically, training policies are usually non-existent (or if policies do exist they are often vague). Supervisor training is especially bad.

Industrial trainers need to pay more attention to identifying training needs, setting precise training objectives, developing systematic course development procedures and producing good quality course materials. In all of these areas TAFE has a good record. Therefore, industry is urged to buy TAFE expertise whenever this is appropriate; and TAFE needs to market itself to industry. (A Centre publication on marketing TAFE[9] is available.)

In most of the media discussion on industry restructuring there has been the implied assumption that big manufacturing enterprises are the ones being restructured. However, most of Australia's industrial and commercial enterprises are small employers of labour; and manufacturing is not the only area requiring restructuring. Most of Australia's employers do not employ anyone possessing the necessary expertise to deal with the retraining issues arising from restructuring. They will need help, and TAFE can provide that help.

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Sheldrake, P. (1988). The TAFE system and industry: joint use of facilities.

Bone, J. (1988). Training models used in industry.

Hall, W. C. (1988). TAFE/industry liaison-seminar coordinator's notes and sound cassette.

All are distributed by Nelson Wadsworth.

7 Hayton, G., Hayes, M., Neylon, K., & Inglis, A. (in preparation). Integrating quality concepts into existing TAFE courses. Adelaide: TAFE National Centre for Research and Development.

A free brochure about the Quality project is available from the Centre.

8 Bone, J. (1988). Training models used in industry. Melbourne: Nelson Wadsworth for the TAFE National Centre for Research and Development.

9 Cutter, P. et al. (1988). Marketing TAFE. Melbourne: Nelson Wadsworth for the TAFE National Centre for Research and Development.

2. TRAINING FOR INTEGRATED MANUFACTURING: A REVIEW OF RECENT LITERATURE

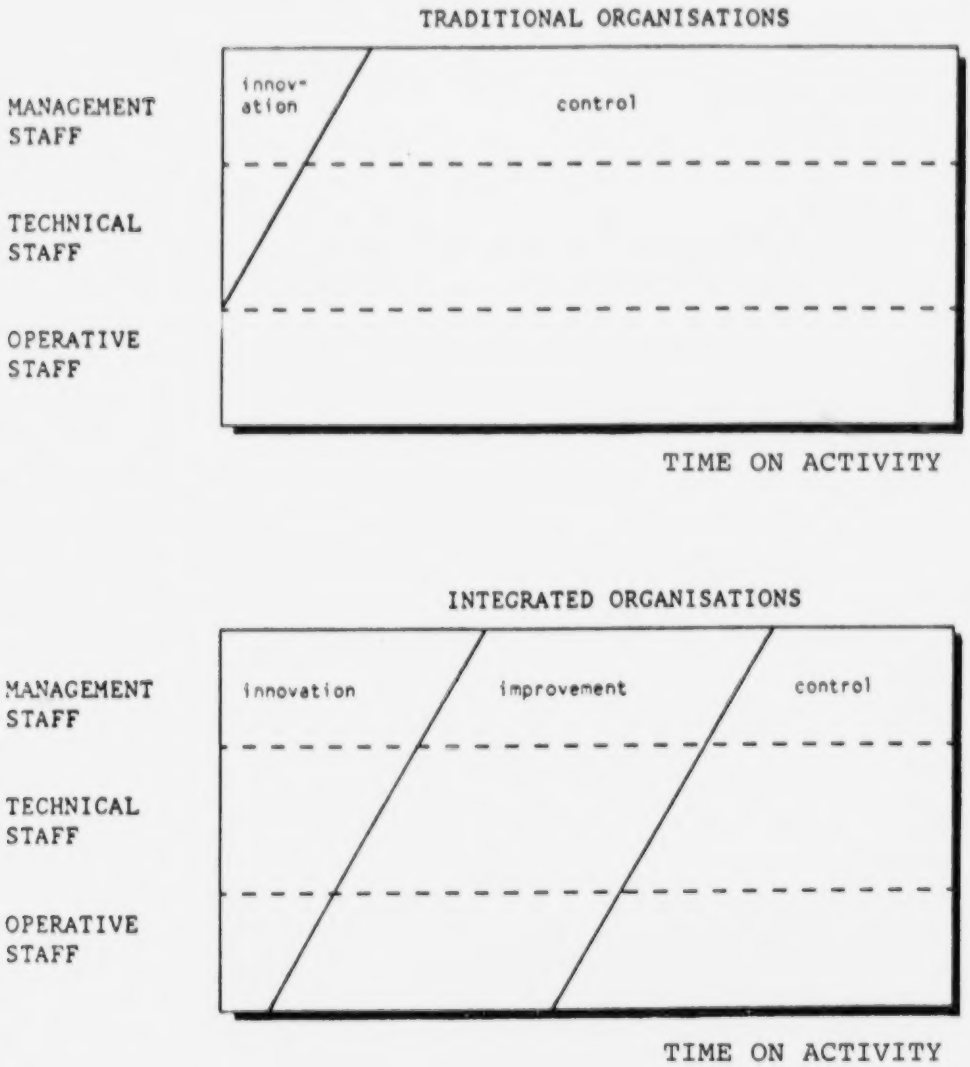
Geoff Hayton and Mahommed Harun (1988)

This literature review is part of a larger project which includes a survey of educational institutions in Australia and overseas. Two short extracts have been selected. The first explains the difference between integrated manufacturing and traditional manufacturing organisations. The second discusses the training responses needed for integrated manufacturing.

The difference between integrated manufacturing and the traditional manufacturing organisation is illustrated in Figure 9. In 'integrated organisations' production workers are called upon to improve quality systematically and improve manufacturing generally.

As well as controlling the quality of their products, workers may also do servicing and maintenance routines. In short, production workers will need a broader range of functional skills and this underlines the importance of multi-disciplinary training programs.

FIGURE 9: EMPHASES ON INNOVATION, IMPROVEMENT AND CONTROL IN TRADITIONAL AND INTEGRATED ORGANISATIONS



5. TRAINING RESPONSES FOR INTEGRATED MANUFACTURING

The introduction of integrated manufacturing in Australia will have a major effect on Technical and Further Education (TAFE) course content and course structure. Courses preparing individuals for integrated manufacturing (involving, as discussed in earlier sections, higher skill, new technology and integrated work organisation) will need to develop the individual's abilities to:

- adapt to changes in technology;
- more readily transfer skills to new areas of specialisation;
- combine skills in two or more disciplines;
- readily accept and seek retraining at appropriate points throughout working life;
- pass on knowledge to others;
- appreciate business competencies.

With respect to course content, there will need to be:

- greater emphasis on conceptual learning;
- greater emphasis on scientific and technological 'literacy', the social implications of technological change and quality concepts in primary, secondary and tertiary education;
- the development of investigative and problem-solving skills;
- the development of 'learning to learn' skills;
- the development of teaching skills;
- the development of a broader awareness of the industry and industry restructuring in vocational courses;
- the development of team skills and skills associated with working in more complex, less regimented management structures.

The keyword for appropriate course structures of the future is flexibility, and it has been suggested that this could be achieved more readily by a modular course structure with broad-based modules early in the course. (Hayton 1986, p.140; Hall & Hayton 1988, p.7). Each module should be able to stand alone and be capable of being separately assessed. However, some modules will need to specify pre-requisite skills or modules. The structure should allow for multiskilling, multiple entry and exit points, and retraining.

This flexibility is only possible if:

- the length of the course (or period of study) is not considered a major criterion of learning success;
- courses specify the competency standards to be achieved and the conditions under which the competencies are to be achieved (DOLAC 1988);
- courses can be developed, approved, accredited and reaccredited quickly.

TAFE courses will need to allow for both horizontal mobility (e.g. between trades or subject disciplines) and vertical mobility (e.g. between job levels and between academic awards or institutions). Such flexibility could mean:

- course structures which allow a greater range of choices in combinations of subjects or modules, including cross-disciplinary combinations across related disciplines such as mechanical and electrical engineering and even across traditionally unrelated disciplines such as engineering, accounting and psychology;
- course structures which allow multiple entry and exit points and retraining;
- a restructuring of education towards administrative groups and courses based on industry groups rather than occupations;
- greater integration, articulation and accreditation between educational institutions and company-specific training and between the educational sectors of secondary, TAFE, advanced education and university (Parkinson et al. 1986; Dawkins 1988).

There is evidence that many TAFE courses will require major re-organisation. Urgent specific training needs include:

- the need for modified TAFE courses, especially in engineering courses;

- the organisation of effective training programs for operators in the service industries of integrated manufacturing;

- a higher level and specialised vocational training, especially in maintenance, total quality control, programming, and CIM system development;

- programs for the development of a higher level of cognitive skill;

- the development of new cross-disciplinary training programs;

- the integration of new skills into existing vocational programs, like computer literacy, higher mathematical and analytical skill, process development and quality improvement;

- appropriate and relevent programs and courses for supervisors and managers so as to 'achieve the desired benefits from . . .' integrated manufacturing (Majchrzak 1986, p.117); and

- greatly increased retraining for upgrading and updating the skills of the existing workforce whose skills and job content will be modified and changed.

In addition to the major changes in training outlined above, a greatly increased need for retraining is associated with the introduction of integrated manufacturing, and this is referred to in the last point above. The use of the term *retraining* in this paper is not meant to imply the discarding or changing of skills acquired through previous training, but rather the supplementation of existing skills with new skills through training.

This will require industry to make a higher level of commitment to training (Hall 1987; 1988; Dawkins 1988). This need may be partly met by TAFE and other training providers offering modules from larger accredited courses. To meet the range of needs of people in the workforce, flexibility in course provision is required. Two types of retraining may be distinguished:

- courses which 'update' skills in cases where new technology is being introduced;

- courses which provide additional skills in a new area (including 'multi-skilling').

Both types of retraining will be required for integrated manufacturing.

The balance of the retraining need may be met by industry itself through a variety of training arrangements, including:

- in-house training using in-house trainers (both 'professional' trainers and skilled operators with a training role);

- in-house training using external trainers;

- off-site training funded by individual companies.

Each may involve TAFE or private training consultants in the planning of training (including training needs analysis and curriculum development) and/or delivery of training (Hayton et al. 1988; Hall 1988).

3. TRANSLATION OF LABOUR MARKET NEEDS INTO TRAINING RESPONSES

Geoff Hayton (1988)

A paper presented at a conference in 1988 was included in the November 1988 edition of the Australian Journal of TAFE Research and Development. The author argues that the present methods of translating labour market needs into training responses must change, because present approaches are based on stable, well-defined and specialised occupational classifications.

TRANSLATION OF LABOUR MARKET NEEDS INTO TRAINING RESPONSES

Geoff Hayton

We have reproduced here an edited version of the paper presented by Geoff Hayton at the Conference on Australian Skills Shortages and Labour Market Data conducted by the Centre for Research in Education and Work (CREW), School of Education, Macquarie University, Sydney, May 12-13, 1988. In it the author looks at how training programs should be related to labour market needs.

INTRODUCTION

The main argument of this paper is that present methods of translating labour market needs into training responses will need to change to take account of the different economic setting in Australia, now and in the future. To support this argument I will outline:

- the changing economic setting;
- some problems with the present approaches to translating labour market needs into training responses;
- a suggested new integrated approach.

The paper will focus on the manufacturing industries, and outline some possible effects on training responses of the changing economic setting.

In discussing the translation of labour market needs into training responses, I am using these terms in their broadest sense. In this paper, *labour market needs* will refer to the present and expected future skilled workforce demands, in terms of both number of people and skills required. *Training responses* will refer to all vocational education and company specific on-the-job training in terms of the institutional structure, course content and training arrangements.

As two other terms will frequently be used in this paper I will define the sense in which I am using them. *Mass production* means the approach to production involving the transfer line, specialisation of production machinery and specialisation of production workers. *Flexible manufacturing* means the approach that uses general-purpose production machinery and workers who are able to turn out a wide and constantly changing assortment of goods.

THE CHANGING ECONOMIC SETTING

Industry trends in Australia are reasonably clear. In common with most other industrialised nations, Australia is experiencing the following changes to its economy:

- a major structural shift in employment from manufacturing to service industries, with an expected shift to leisure/entertainment industries;
- the development of 'new' industries (alongside industries hundreds of years old), such as plastics, information technology, biomedical technology, with an expected movement towards new materials technologies;
- a trend away from mass production towards flexible manufacturing in the manufacturing industries.

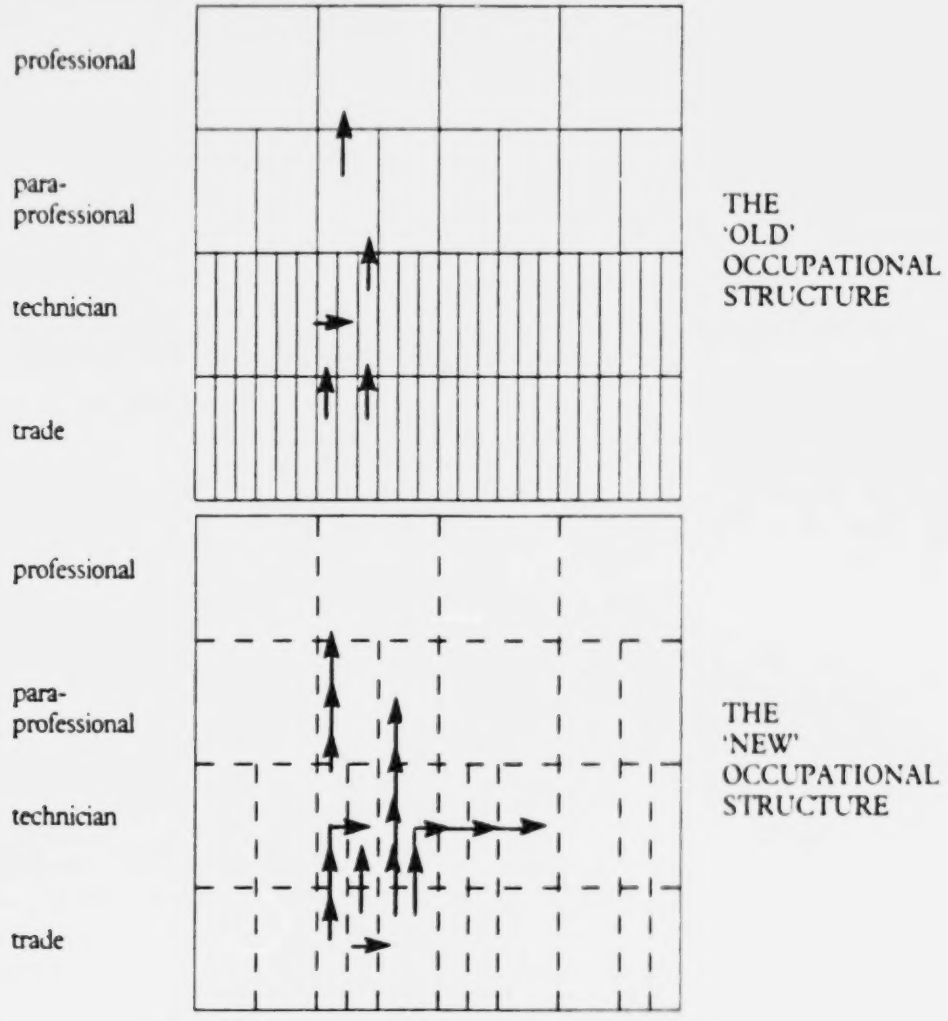
Even though each of these changes has significant implications for Australia's training system, the response has been slow. To illustrate the depth of response required by the training system, let us consider the trend from mass production to flexible manufacturing.

Mass production has been the dominant approach in manufacturing industries in the developed countries for about a century. In turn, this approach has influenced the design of jobs, industrial relations and the training system.

Until recent years, the broad trends this century in the manufacturing industries have been:

- greater refinement of mass production techniques;
- greater specialisation of machinery;
- specialisation of the skills of workers; and
- segmentation of occupations.

This has resulted in a large number of trade occupations with rigid demarcations between them. While there are fewer para- professional and professional occupations, even at these levels, boundaries between 'disciplines' are difficult to cross. A simplified representation of this 'old' occupational structure is given in Figure 1.



Note: In both structures, each rectangle represents an occupational classification.

FIGURE 1
SIMPLIFIED REPRESENTATION OF THE OLD' AND NEW' OCCUPATIONAL STRUCTURES
(adapted from Hayton and Cheyne, 1988, p.5).

Mass production relies on a stable mass market but many writers point to an increasing instability and diversity in world markets which together with the development of techniques and technologies of flexibility, are causing the decline of mass production and encouraging the development of flexible manufacturing (see for example Piore and Sabel 1984; Mathews et al. 1987). Figure 2 lists the main characteristics of mass production and flexible manufacturing and illustrates the sorts of changes that may be expected in a trend towards flexible manufacturing.

If the trend towards flexible manufacturing in Australia continues, major changes to the training system and the way we collect labour market data will be required. Present labour market data collection is based on a pattern of specialised, well-defined and stable jobs. Flexible manufacturing encompasses jobs with a much broader range of duties required by the workforce. Marketing, research and development, and design and production workers as well as operatives will need to have a broader range of skills than in the past. In flexible manufacturing, the introduction of new technology generally results in an increase in the skill requirements for most workers, whereas in mass production the reverse generally applies (Mathews et al 1957).

In the 'new' occupational structure of flexible manufacturing, there will be fewer trade occupations, with each trade covering a broader band of skills. The boundaries between trades and between disciplines at the professional level will be easier to cross. There will be fewer restrictions on individuals moving between occupational levels because of greater articulation between different educational qualifications. The greater horizontal and vertical mobility is indicated by broken boundary lines around each occupational classification in the 'new' occupational structure represented in Figure 1.

Figure 1 illustrates some of the key differences between the 'new' and 'old' occupational structures. These include:

- fewer occupational classifications, particularly at the trade level, in the 'new' structure;
- greater horizontal and vertical mobility (indicated by broken rather than solid lines) in the 'new' structure.

The arrows indicate typical movements of individuals from one occupation to another. In the 'old' occupational structure, boundaries are difficult to cross and so if any movement does occur, it is likely that only one boundary would be crossed. In many cases a person is forced to start a vocational course from scratch in order to enter a new occupational classification. Also, skills acquired informally are unlikely to be recognised (Thomson 1988). In the 'new' occupational structure, greater flexibility within each (broader) occupational classification is allowed, and occupational mobility by the crossing of one or more boundaries is easier and more likely. Easier crossing of boundaries will occur through greater integration and articulation of vocational courses. This is discussed later in this paper.

Australia is presently in the transition between the 'old' and 'new' occupational structures. In the printing industry, for example, there were over twenty trades in the 1960s and 14 trades in the 1970s and only five since 1977. There are indications that the current five trades will further reduce to four by combining the two pre-press trades into one. Further, a study of the para-professional occupations in engineering found there is evidence of a significant number of multi-discipline occupational clusters (Hayton 1986, p. 137-142).

PRESENT APPROACHES TO TRANSLATING LABOUR MARKET NEEDS INTO TRAINING RESPONSES

This section outlines some key issues involved in the assessment of labour market needs as a basis for focussing on the translation of needs into training responses.

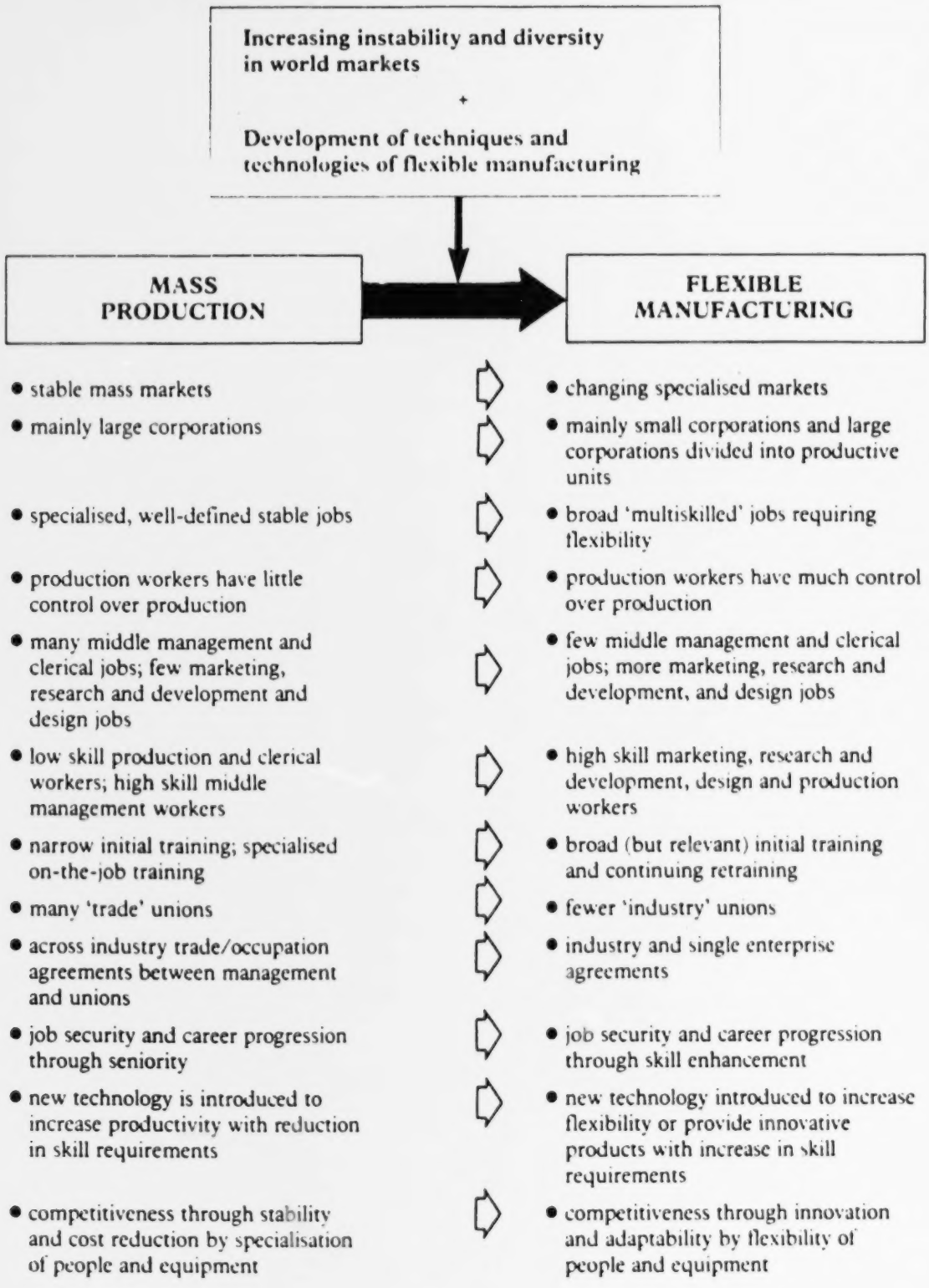

Increasing instability and diversity in world markets
+
Development of techniques and technologies of flexible manufacturing
MASS PRODUCTION
FLEXIBLE MANUFACTURING
• stable mass markets
• changing specialised markets
• mainly large corporations
• mainly small corporations and large corporations divided into productive units
• specialised, well-defined stable jobs
• broad 'multiskilled' jobs requiring flexibility
• production workers have little control over production
• production workers have much control over production
• many middle management and clerical jobs; few marketing, research and development and design jobs
• few middle management and clerical jobs; more marketing, research and development, and design jobs
• low skill production and clerical workers; high skill middle management workers
• high skill marketing, research and development, design and production workers
• narrow initial training; specialised on-the-job training
• broad (but relevant) initial training and continuing retraining
• many 'trade' unions
• fewer 'industry' unions
• across industry trade/occupation agreements between management and unions
• industry and single enterprise agreements
• job security and career progression through seniority
• job security and career progression through skill enhancement
• new technology is introduced to increase productivity with reduction in skill requirements
• new technology introduced to increase flexibility or provide innovative products with increase in skill requirements
• competitiveness through stability and cost reduction by specialisation of people and equipment
• competitiveness through innovation and adaptability by flexibility of people and equipment

FIGURE 2
THE TREND FROM MASS PRODUCTION TO FLEXIBLE MANUFACTURING.

Identifying labour market needs.

Many have claimed that there are skill shortages in Australia. However, Curtain (1987), Marceau (1987) and Ashenden (1988) argue that rather than a general skill shortage, the main problem is a failure by industry to exploit the skills already available. Perhaps part of the reason for the apparently conflicting views is the variability and complexity of Australia's skill requirements. To overcome this, I suggest that any analysis of Australia's skill requirements should take account of the following:

- the distinction between skill requirements in terms of 'quantity' (the number of people possessing a particular set of skills) and 'quality' (the matching of individuals to the job skill requirements — the group of people possessing a particular set of skills may need some new skills to enhance the existing skill set);
- the variability of skill requirements in 'quantity' and 'quality' across industries (analysis on an industry by industry basis is more meaningful than averaging over the whole workforce);
- the variability of skill requirements across regions in Australia;
- the distinction between trends over the past few years and changes expected over the next few years (past trends may not necessarily be a good guide to what will happen in the next few years);
- the extent and pattern of use of skilled people by industry (only a fraction of the skills available are used in industry).

Some of these issues will be illustrated later in the paper when discussing the future skill needs of Australia's manufacturing industries.

Translating needs into training responses.

The present approaches to translating needs into vocational education responses rely on a mixture of what may be termed *supply* and *demand* methods.

Supply methods rely on demographic and labour market data from the Australian Bureau of Statistics, the Department of Employment, Education and Training, and other sources. The TAFE authorities in Australia use this information to help plan the allocation of capital and recurrent resources to particular regions and courses and to help in curriculum planning. Curriculum planning procedures in vocational education usually follow a sequence which starts with a decision to review a particular existing course. In some cases a committee of experts provides up-to-date occupational information; in other cases a full occupational analysis or training needs analysis is undertaken to provide the basis for curriculum development. As part of the review process, published labour market data may be referred to.

The translation of demographic and labour market data into planning decisions in TAFE varies considerably from state to state. However, irrespective of the methods that are used, some general problems may be identified, namely:

- for medium- to long-term planning, traditional methods of labour market forecasting are notoriously unreliable (Fuller and Oxley 1987);
- sometimes the supplier or user of labour market data fails to take account of one or more of the issues mentioned earlier, namely:
- — the distinction between skill 'quantity' and 'quality';
  — the variability across industries;
  — the variability across regions;
  — the distinction between past trends and expected future changes;
  — the extent and pattern of use of skilled people by industry;
- the use of labour market data by vocational education planners and curriculum designers

is based on the existing structure of courses, making it difficult to 'see' the need for a restructuring of courses in a particular industry or courses in new industries;

- the present collection and use of labour market data is based on the concept of stable and well-defined occupations; increasingly this is not the case.

Demand methods complement supply methods in that they help shape immediate and short-term training responses. For part-time vocational courses in TAFE the process is simple. The demand or lack of demand for a particular course in a particular area usually determines whether the course is held there. When full-time courses are involved and when limited resources are taken into account, the translation of demand into the provision of student places is more complex. An enrolment quota is set or the enrolment is limited by the prior allocation of resources to each course and in each institution. This is affected by a number of factors, including enrolment levels of previous years and medium term planning decisions.

AN INTEGRATED APPROACH TO TRANSLATING LABOUR MARKET NEEDS INTO TRAINING RESPONSES.

An integrated approach to translating labour market needs into training responses, would overcome many of the problems of the present approaches. The integrated approach was developed by Don Fuller and Steven Oxley in the Labour Economics Division of DEET, and Hugh Guthrie and myself at the TAFE National Centre for Research and Development. A manual on this approach has been prepared by the Centre and DEET (Hayton et al 1988).

The approach draws closer together the collection of labour market data and the consequent training (and non-training) responses. The starting point is the recognition of a particular problem or the need for planning in a particular industry (or enterprise). The main steps involved are shown in Figure 3.

A key feature of the approach is the opportunity to integrate the four types of analysis, namely:

- industry analysis;
- labour market analysis;
- occupational analysis;
- training needs analysis,

into a single study to gain a comprehensive view of workforce issues, rather than have a series of separate studies (definitions of these four types of analysis are given in the Appendix). This comprehensive view is particularly useful when jobs are changing by becoming less specialised and less well defined, as in flexible manufacturing. An occupational analysis by itself may give a misleading picture, whereas a broader study, involving all four types of analysis, will give more useful information.

The trend towards a new occupational structure in the manufacturing industries suggests that narrow single occupation studies will be unsuitable and that studies of groups of occupations within an industry will be more appropriate for the planning of training responses by government. In times of dramatic change in occupational structure, it is inappropriate to study single occupations in isolation from other occupations and the industry as a whole.

Another feature of the approach is its applicability to different settings, for example a national workforce study for an industry or a workforce study for a single enterprise. The manual has been written with this diversity of situations in mind.

The general procedure described in the manual is as outlined in Figure 3. Any study involving the first four steps (define, plan, conduct and report) is termed a *workforce study* in

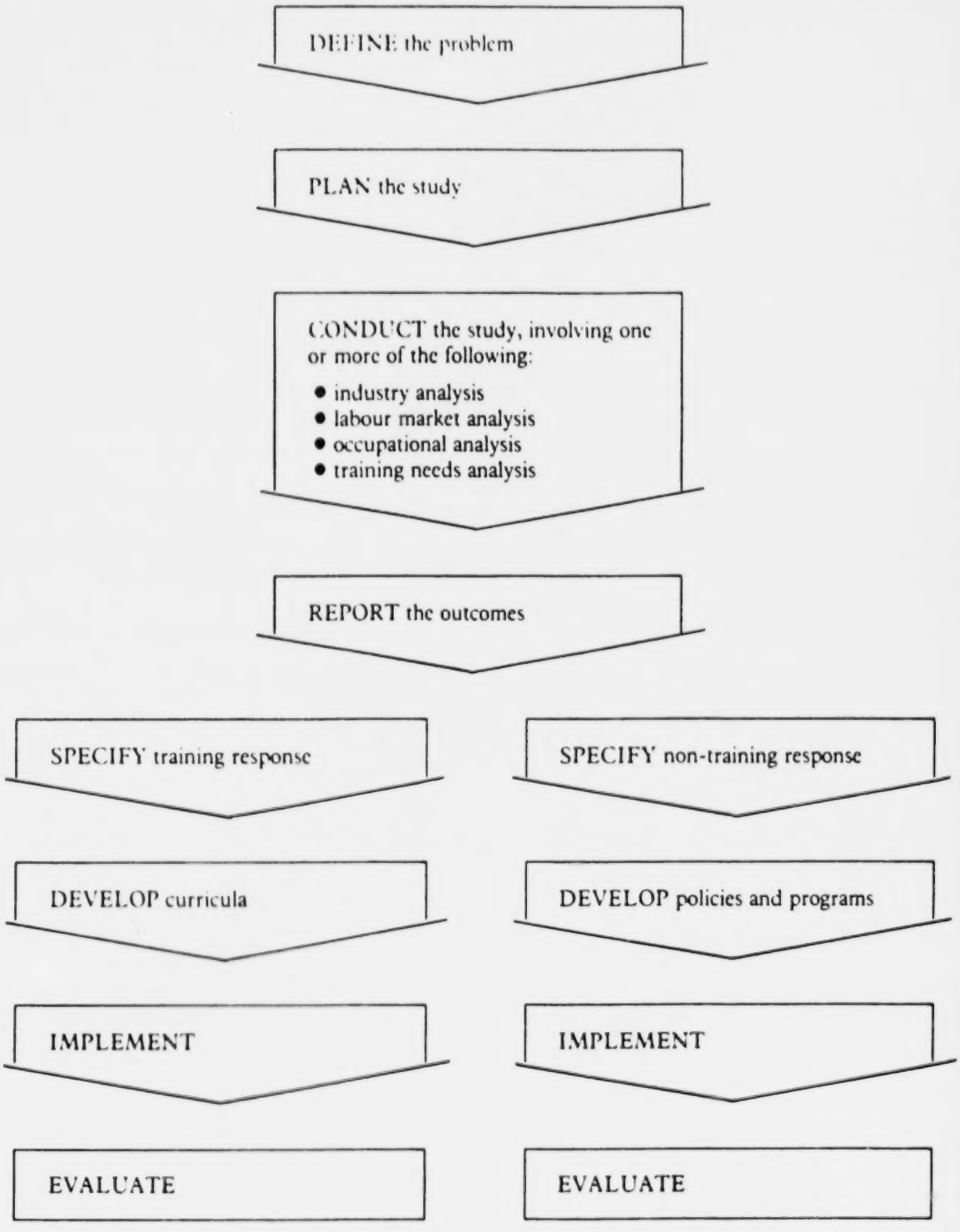


FIGURE 3
OVERVIEW OF AN INTEGRATED APPROACH TO TRANSLATING LABOUR MARKET NEEDS INTO TRAINING (AND NON-TRAINING) RESPONSES

the manual, regardless of whether a single type of analysis is involved or any combination of the four types of analysis.

The range of workforce studies.

Referring back to the broad definition of labour market needs at the beginning of this paper, it is clear that workforce studies for the assessment of labour market needs would include one or more of the four types of analysis discussed in the previous section. For existing approaches and the integrated approach, a wide variety of studies is possible. Some of the variables include:

- geographical scope of study (e.g. national, state, regional);
- setting of study (e.g. an industry, a sector of an industry, a single enterprise);
- occupational scope of study (e.g. all occupations within an industry, a group of occupations within an industry, a single occupation across all industries).

Flexible manufacturing means that the jobs within each enterprise, and hence the training needs of workers, will not be uniform across enterprises as in mass production. It is therefore important for those enterprises adopting a flexible manufacturing strategy to conduct workforce studies to identify the training needs of their workers. This will require new attitudes to training in many of Australia's enterprises. Recent studies have found that few companies plan manpower requirements and only 40% of manufacturing companies have a training budget (Marceau 1987, p.17).

From workforce study to training response.

The translation of labour market needs, identified in a workforce study, into training (and non-training) responses is usually straightforward if the provider of training, such as TAFE, sponsored and/or undertook the workforce study. In simple terms, when the 'data user' is also the 'data provider', action is more likely to follow. When the data provider and data user are separate bodies, many of the resultant problems discussed earlier could be minimised by closer co-ordination of the activities of the bodies. The integrated approach presented earlier provides a framework which is likely to increase the cooperation between data providers and users.

At present there are many providers of labour market data in Australia, including:

- Australian Bureau of Statistics;
- Department of Employment, Education and Training;
- state and territory employment and training bodies;
- employer associations;
- unions;
- industry training committees; and
- TAFE.

Many of these are also users of labour market data. The co-ordination of the activities of these bodies in the area of labour market data provision and use is probably best done at the industry level. The national and state industry training committees seem well placed to provide a mechanism for co-ordination. Most of the providers and users listed above are represented on the 20 or so national industry training committees in Australia.

TRAINING RESPONSES FOR THE MANUFACTURING INDUSTRIES.

The TAFE National Centre has recently begun a research study on the training and retraining needs created by the introduction of flexible/integrated manufacturing in Australia. The situation in our manufacturing industries illustrates the principles of labour market needs and training responses discussed in this paper. Our initial research indicates that the key issues are:

- the pattern of use of skills by industry; and
- the 'quality' of skills required rather than 'quantity'.

The pattern of use of skills.

For enterprises moving towards flexible manufacturing, the best use of skills requires a new approach to work organisation involving the removal of many existing practices by employers and unions. The current negotiations on restructuring in the metal industries illustrate the broad changes required. The proposed new award structure in which there are fewer trade classifications appears to offer a more appropriate framework — it is closer to the 'new' occupational structure described earlier. However, it will still be up to individual enterprises to realise the full potential of the techniques and technologies of flexible manufacturing and the new award structure in order to use and develop workforce skills fully. Curtain (1987) and Marceau (1987) have described many of the factors restricting the full use and development of skills in individual enterprises.

The 'quality' of skills.

In terms of 'quantity' of skills, the big increase in demand is in the service industries. Over the past ten years or more the employment in the service industries has grown strongly in Australia, with many of the new jobs being low skill jobs. Most commentators expect this trend to continue. In the manufacturing industries however, employment has remained fairly static. But taking 'quality' of skills into consideration, big changes in the manufacturing industries are forecast. Many commentators expect an increase in high skill jobs in these industries as flexible manufacturing is introduced (Piore and Sabel 1984; Mathews et al. 1987; DITAC, 1987).

If these commentators are correct and the high skill jobs are required in the manufacturing industries in Australia, then the initial vocational education of those entering these industries will need to develop the individual's abilities to:

- adapt to changes in technology and new forms of work organisation;
- transfer skills more readily to new areas of specialisation;
- combine skills in two or more disciplines ('multiskilling'); and
- accept and seek retraining at appropriate points throughout their career.

That is, initial training for the manufacturing industries in Australia will need to develop flexibility and allow for both horizontal mobility (for example between trades or subject disciplines) and vertical mobility (for example between job levels and between academic awards or institutions). Such flexibility does not necessarily mean that rigour and depth of knowledge within a discipline need be sacrificed. However it could mean:

- greater emphasis on 'technological literacy' and the social implications of technological change in primary, secondary and tertiary education;
- the development of 'learning to learn' skills;
- the development in vocational courses of a broader awareness of the industry;
- course structures which allow a greater range of choices in combinations of subjects or

modules, including 'multiskilling' combinations across traditional disciplines such as mechanical and electrical engineering;

- a restructuring of educational institutions towards schools/faculties and courses based on industries rather than occupations;
- greater integration and articulation within and between educational institutions and between the educational sectors of secondary, TAFE, advanced education and university. (see Parkinson 1985; Parkinson, Mitchell & McBeath 1986; Dawkins 1988.) The Federal Government in its recently released policy statement on higher education has accepted the need for more effective articulation and has included proposals aimed at improving it (Dawkins 1988, p 22-3).

Integration of courses and articulation of awards in vocational education.

An important action towards greater integration and articulation has been the development of a coherent classification of tertiary awards applying to all tertiary institutions and covering the full gamut of occupations from operative to professional level (ACTA 1988).

The new classification system as developed by the Australian Council for Tertiary Awards (ACTA) has been adopted by TAFE and higher education institutions. The system has two main components:

- purpose of course (recreation, leisure and personal enrichment; entry to employment or further education; initial vocational preparation; subsequent to initial vocational — signified by streams 1000, 2000, 3000 and 4000 respectively); and
- occupational level of course (for streams 3000 and 4000 only).

In these two streams, ACTA suggests six occupational levels while Hayton and Cheyne (1988), by not differentiating within the para-professional level, propose five. The levels they propose are:

- stream 100 — operative level;
- stream 200 — trade or other skilled level;
- stream 300 — technician level;
- stream 400 or 500 — paraprofessional level;
- stream 600 — professional level.

These five occupational levels have been identified consistently in numerous research studies (see, for example, French 1981; Hayton 1986; ASCO 1987), and are used in the Australian Standard Classification of Occupations (ASCO).

The stream 3000 and 4000 classifications provide a framework for an integrated set of courses which offer career progression for individuals. This framework, up to the para-professional level, is shown in Figure 4, which indicates that individuals may prepare for an occupation at any level by entering an initial vocational course (in the ACTA classification a 3000 course) from school. After completing that course, the individual is qualified to perform jobs within the particular occupational level (indicated by short arrows pointing horizontally outwards from each stream 3000 box in Figure 4).

After completing the initial vocational program, a course leading to a higher vocational level or one subsequent to an initial vocational course (4000) may be undertaken. In particular, the stream 4000 courses may provide the off-the-job retraining which will be important in our manufacturing industries. Two types of retraining may be distinguished in the stream 4000. They are courses designed to:

- update skills in cases where new technology is being introduced;

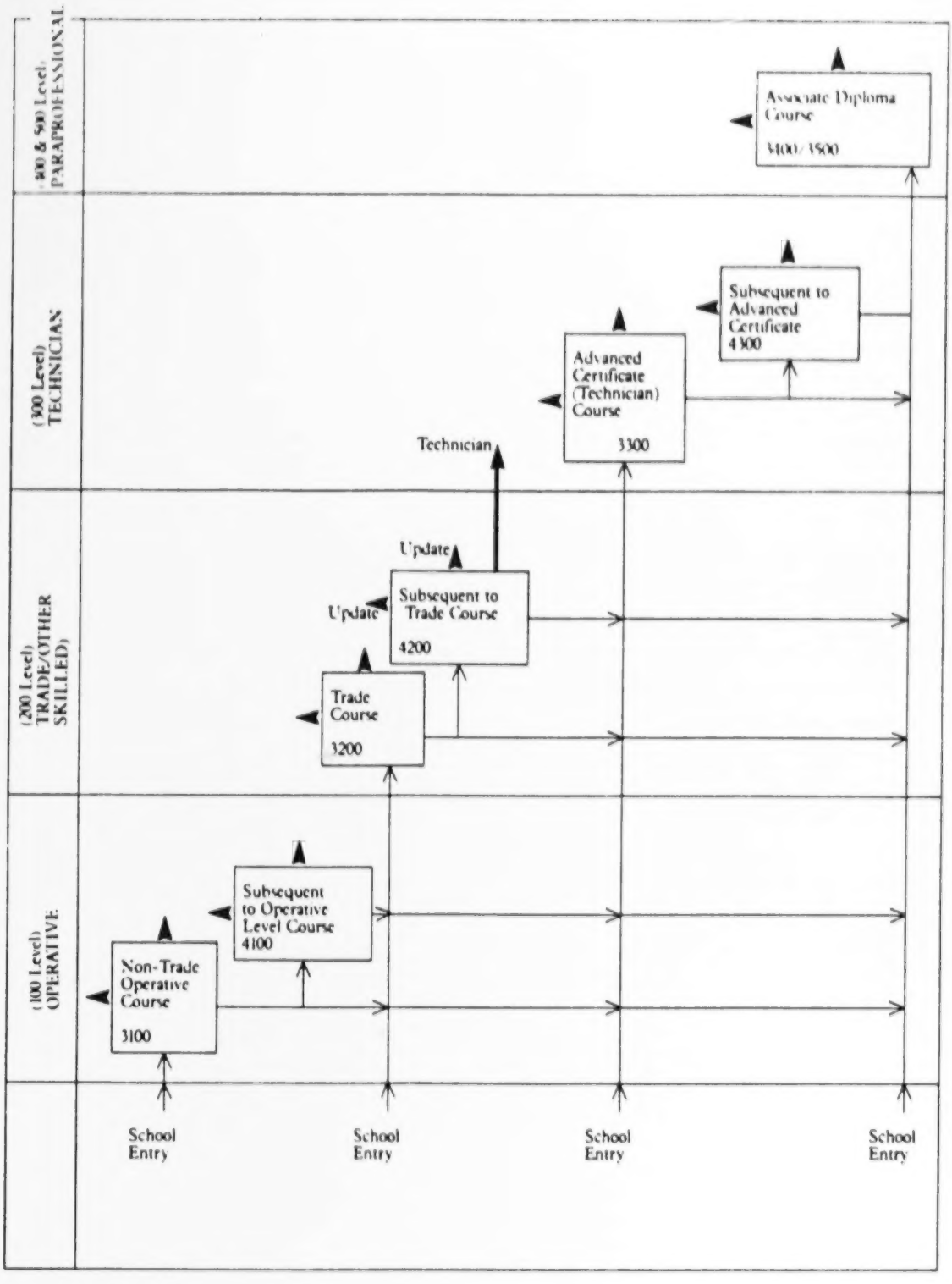


FIGURE 4
OCCUPATIONAL LEVELS AND COURSE CLASSIFICATIONS.

- provide additional skills in areas related to existing skills (including 'multiskilling').

If the Australian manufacturing industries are to obtain the higher skilled workforce required by the 'new' occupational structure of the flexible manufacturing future, a career structure should be developed which encourages retraining through higher vocational level courses subsequent to initial vocational courses and through on-the-job training. Retraining should be accepted as a natural part of the working career of each worker.

CONCLUSION

Australia's changing economic environment includes a trend towards flexible manufacturing. If we could take a strategic view of the changes of the past ten years and the next ten years, we would be impressed by the fundamental nature of those changes.

The changes require a workforce of a different character from that of the past. In the manufacturing industries, qualities of innovation and flexibility combined with detailed technical expertise will be required by many, not just a small 'elite'. But the changes also require different approaches to the collection of labour market data and their translation into training responses. Present approaches are based on stable, well-defined and specialised occupational classifications. A more effective approach in the new setting would involve analysis on an industry by industry basis, greater integration of the four different types of workforce study, and greater co-ordination between the data providers and users. There is also an increased need for enterprises to conduct their own workforce studies and for retraining to be provided by enterprises and educational institutions.

APPENDIX:

DEFINITIONS OF INDUSTRY, LABOUR MARKET, OCCUPATIONAL AND TRAINING NEEDS ANALYSIS.

The following definitions are given in DEET (in press), *Conducting Workforce Studies:*

Industry Analysis involves:

- determining the boundaries of the industry under consideration;
- examining determinants of the industry's activity levels; and
- assessing likely future industry activity and employment levels in light of expected movements in these determinants.

Labour market analysis is defined as:

> The assessment of the numbers in each occupation or job, in terms of the current and predicted requirement (demand) for personnel compared with the current and predicted availability (supply) of qualified people to fill such positions.

Occupational analysis is defined as:

> The identification of the current and likely future jobs within an occupation, and the duties and tasks which comprise each job, together with other relevant job information.

In this definition the terms occupation and job are hierarchical. That is, an occupation (e.g. electrical engineer) may consist of a group of jobs (e.g. electrical generation engineer, power transmission engineer, electrical equipment engineer, electrical services engineer).

Training needs analysis is defined as:

> The assessment of the difference between the actual condition (what is) and the desired condition (what should be) in performance within an organisation (or group of organisations) in terms of knowledge, skills and attitudes.

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4. TRAINING NEEDS ANALYSIS

Geoff Hayton, Terry Clark, Maurice Hayes,
Hugh Guthrie (1989)

The Centre was commissioned by the Commonwealth Department of Employment, Education and Training to prepare a large manual entitled Training for Australian Industry. A shorter version of the manual was a monograph Training Needs Analysis, and this extract is taken from that monograph. The copyright belongs to the Department of Employment, Education and Training (whose approval was obtained for this reproduction). The complete monograph is obtained from Government bookshops.

4. PREPARING TO DO A TRAINING NEEDS ANALYSIS

In conducting occupational or training needs analyses, good preparation is the keynote to success.

In Figure 1 we showed the full sequence of workforce analyses through to initiation and evaluation of a training program and feedback.

Figure 2 focuses on the activities described here but also alerts us to a major trap. As trainers we may be tempted to assume that all problems presented to us can be solved by training. As Figure 2 points out, if a problem exists and there is an accurate occupation or job description and there are no deficiencies in knowledge skills or attitudes, then a non-training response will be appropriate.

Figure 2 also shows that the purpose of the occupational analysis is to provide an accurate occupation or job description. This is the preparation needed to conduct a training needs analysis.

Occupational analysis is required if an accurate occupation or job description is not already available. The problem to be rectified may be confined to a single job or may apply to an entire occupation comprising a group of associated jobs. If a full occupational analysis is required, and industry analysis and labour market analysis have not been done, the steps in the complete process will be as shown in Figure 3.

The first two steps:

- define the boundaries of the occupation and structure of the occupation of concern
- identify the context of the occupation

will be necessary preparatory work. If the industry and labour market analyses have been done, these two steps will have been covered. Similarly if only a single job is under consideration then it is likely that the occupational boundaries, structure and context will be well established. Whatever the situation, it is necessary to have this information.

In defining the occupational boundaries and structure the following aspects should be included:

- name(s) of occupation
- range of jobs within the occupation
- structure of jobs within the occupation

FIGURE 2: FLOW CHART OF 'ENTRY AND EXITS' INTO OCCUPATIONAL ANALYSIS AND TRAINING NEEDS ANALYSIS

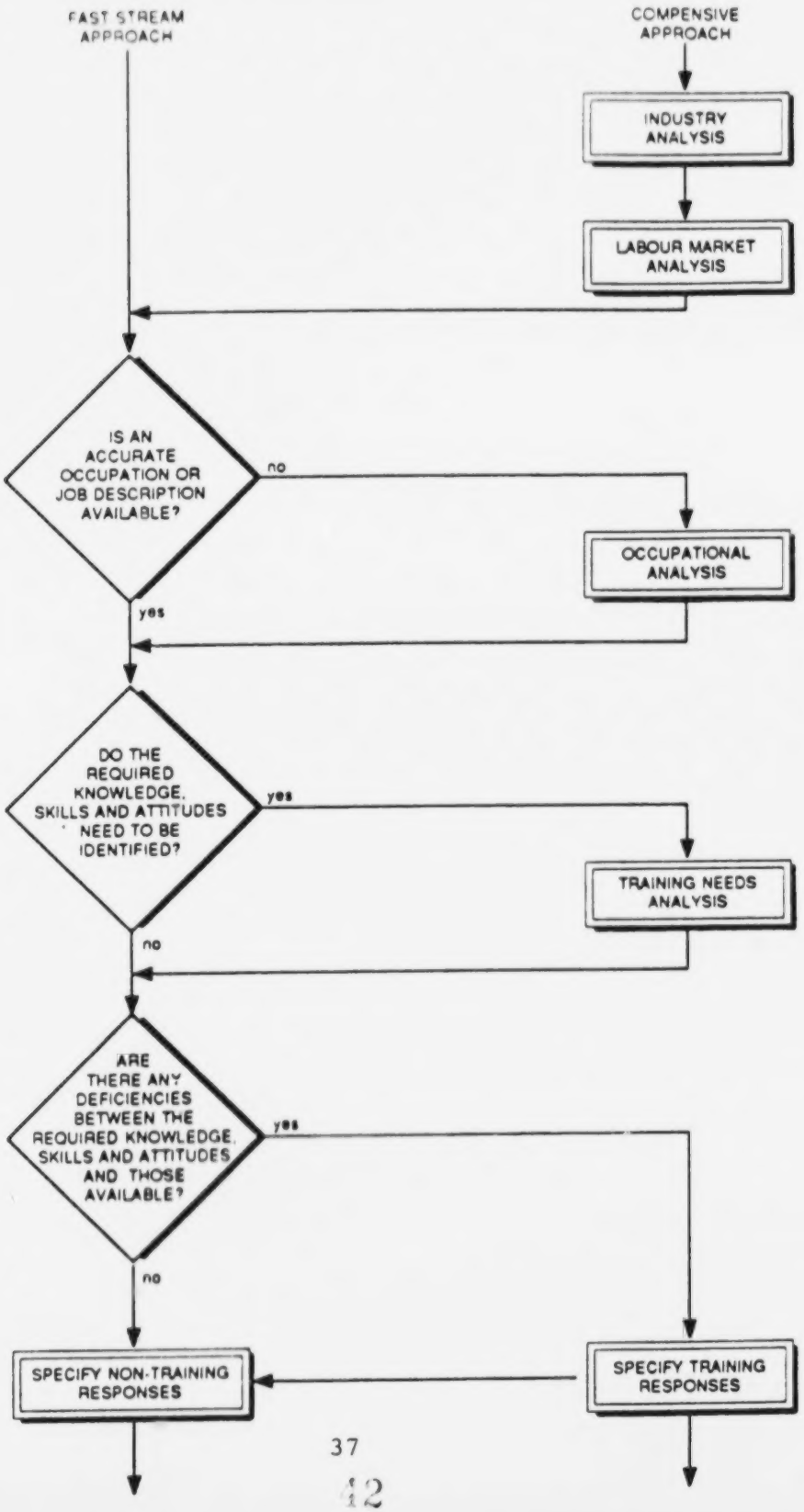
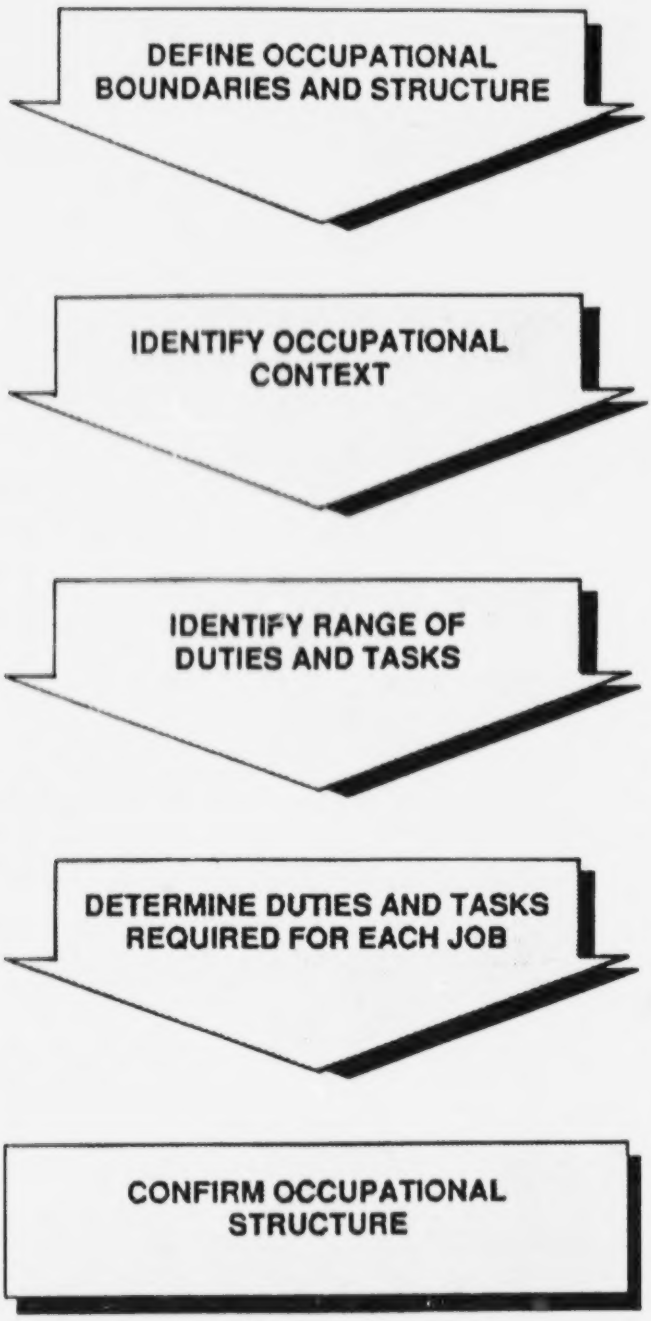


FIGURE 3: FLOW CHART OF OCCUPATIONAL ANALYSIS


DEFINE OCCUPATIONAL BOUNDARIES AND STRUCTURE
IDENTIFY OCCUPATIONAL CONTEXT
IDENTIFY RANGE OF DUTIES AND TASKS
DETERMINE DUTIES AND TASKS REQUIRED FOR EACH JOB
CONFIRM OCCUPATIONAL STRUCTURE

. typical career paths

. major job functions

. occupational trends.

Occupational context would include the following aspects:

. overlap with related occupation

. industry trends

. number of people employed

. education and training

. legal requirements.

Having this information will help to obtain a closer definition of the problem. If occupational boundaries, structure and context have not been obtained from industry and labour market analyses, they can be collected as part of the occupational analysis. In this case, therefore, it is important that all of the five steps described in Figure 3 be included in the occupational analysis.

In the next step of *Identifying the range of duties and tasks*, it is important that all duties and tasks are listed. When changes are likely, it is wise to list the future tasks envisaged at the same time.

Following this it is necessary to determine which duties and tasks are required for each job together with other relevant task level data such as relative time spent on each task. A wide range of task variables may need to be considered. For example:

. performed/not performed

. relative time spent on each task

. frequency of performance

. actual time spent on task

. contribution of task to job

. importance of task

. consequences of inadequate performance of task

. difficulty of learning task.

A check needs to be made that the data collected on the various jobs and tasks which constitute the occupation do, in fact, confirm the occupational structure as identified in the first step.

In this section we have dwelt upon the importance of preparation for a training needs analysis by conducting an occupational analysis. This is because the existence of an accurate occupation or job description is, in our opinion, absolutely essential for conducting a successful training needs analysis. We believe that many of the disappointments which trainers have experienced when conducting training needs analysis are due to inadequate preparation. By this we mean that the occupation or job description was inadequate. Some typical problems even when a job description exists, include:

. inaccuracies

. failure to cover the whole job

. lack of detail (i.e. superficiality)

. out-of-date.

As well as providing the base from which the training needs analysis can proceed, careful occupational or job analysis gives us greater insight and understanding of the occupation, jobs and tasks.

5. TAFE/INDUSTRY PARTNERSHIP
William Hall (1988)

This extract is taken from a summary report which was compiled from three major Centre reports:

(a) Hall, W.C., (1988). TAFE/industry partnership: towards more effective relationships in course development and implementation. Melbourne: Nelson-Wadsworth;

(b) Sheldrake, P., (1988). The technical and further education system and industry: joint use of facilities. Melbourne: Nelson-Wadsworth;

(c) Bone, J., (1988). Training models used in industry. Melbourne: Nelson-Wadsworth.

This extract is mainly concerned with the sharing of facilities, equipment and personnel.

THE CONTEXT

As the Economist pointed out in its 'Factory of the future' supplement (30 May 1987), the factory is being reinvented from scratch. Long narrow production lines with people crawling all over them are out. All-purpose, make anything, machines huddled in cells run by computers are in. The new jargon terms are computer integrated manufacturing (CIM), flexible machinery centre (FMC), flexible manufacturing systems (FMS) and computerised numerical control (CNC) tools. Both the technology used and the way production is organised are continually changing. The Economist gave the following example from Toyota. Quick release fasteners now enable dies on 1000 tonne presses to be changed in ten minutes (in one dramatic example, a forge for making bolts, the time taken to change dies was reduced from eight hours to less than one minute). Practically all of the parts for making a Toyota are now manufactured on the same day that the car is assembled and driven from the factory.

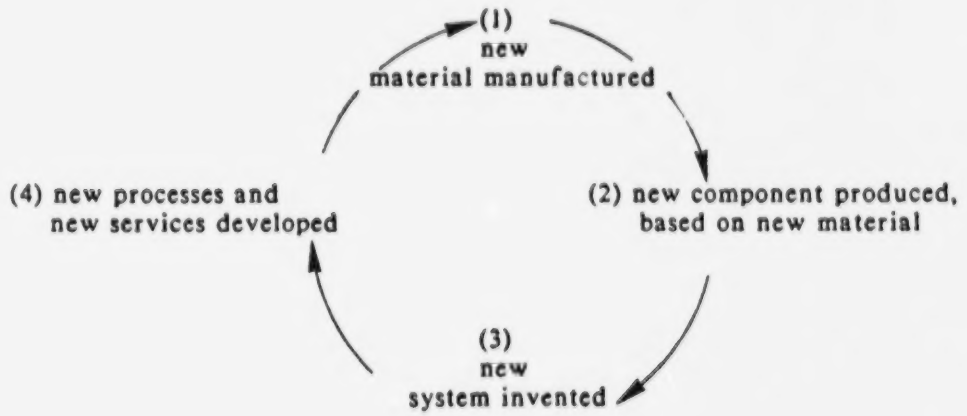
The machines are available to anyone in any Western country; it is the management which makes the difference. With changes like these taking place in competitive nations, it is of crucial importance that Australia's limited training resources in TAFE and industry be combined so that a unified, national approach to training can be developed and implemented. This is essential for the following reasons:

(a) TAFE cannot afford to buy the expensive hi-tech equipment needed in many courses;

(b) industry frequently cannot afford to allow trainees to use some of its hi-tech equipment, or afford the time needed to release hi-tech equipment for training purposes;

(c) industry frequently does not have the capability to train adequately.

Part of TAFE's dilemma is this: how soon, during the development of a new process or the manufacturing of new materials, should TAFE start to plan for training? The developmental cycle is shown below:



For example, the South Australian Department of TAFE has developed a new associate diploma course to cater for the $3.9 billion submarine project. The course is 'mechantronic engineering' (a term used in Japan) which combines components of mechanical, electrical and electronic engineering. How can TAFE continue to be pro-active in this sort of way as well as reactive? Not only is the cycle concerned with product, but the training of people involved in the process is also important.

SHARING FACILITIES, EQUIPMENT AND PERSONNEL

In recent months there have been a number of reports issued on the future development of post-school education in Australia. Among others, one major theme has been the need for greater commitment from industry to training, and the need for tertiary institutions to be more responsive to industry needs. The concerns expressed about the need for greater industry involvement suggest little such interaction takes place at present. To the extent that such a view exists, it is mistaken. There is already considerable interaction in the area of technical and further education.

Much of this interaction is advisory. Industry representatives, both management and union, sit on TAFE committees and boards at every level. At the same time, TAFE representatives sit on bodies ranging from training commissions, through Industry Training Committees, down to professional bodies' training advisory panels. The network of advice and assistance is significant, although by no means as extensive as it might be.

TAFE and industry also share personnel. Many TAFE teachers were previously employed in industry, and in the case of part-time teachers, many remain so. TAFE provides consultancy and training services for individual companies, and industry staff help in developing new programmes or learning to use new equipment.

TAFE and industry also co-operate in relation to equipment and physical facilities. Many companies donate equipment to colleges, as well as raw materials, and others are able to provide access to equipment out of hours, or even during work hours under supervision. Opportunities exist for real work, whereby students undertake tasks for an enterprise which result in repairs being made, or products completed, and are part of the everyday business of the company concerned. TAFE colleges are able to make their equipment available to industry, usually on a charge basis, and this may include real work tasks. Both make use of seminar rooms, and other physical facilities at each other's sites.

The following situations were of particular interest to the investigation:

(a) industry-owned equipment leased out-of-hours;
(b) industry-owned equipment made available free out-of-hours;

(c) industry-owned equipment loaned on a short-term basis for real work to be carried out;
(d) industry facilities used for teaching purposes with company staff as trainers;
(e) joint facilities especially skills training centres and facilitator agencies;
(f) industry staff working in TAFE colleges on a paid or loan basis.

To a significant degree, sharing of equipment between TAFE and industry is very much a function of the relationship that exists between individual firms and staff in colleges, and between industry representative bodies and various skills centres. This observation is important in that it reflects on future strategies to enhance TAFE access to industry-owned facilities: the starting point must be to develop a good co-operative relationship with the industry concerned.

Considerable liaison exists between TAFE and industry. At the same time, there is scope for this to increase, especially if TAFE teachers are to maintain contact with industry developments. Economic pressures are likely to lead to greater emphasis on charging for services, however.

Lease or loan of company equipment or staff

In relation to the first three of the options listed above, the research undertaken suggests that opportunities for use of company-owned equipment on a lease or loan basis must be limited. There is little doubt that this is an approach that has been used - even with students using equipment during normal company work time. However, such use depends on the company being able to provide supervision while equipment is being used, or knowing that college staff can act competently in this role. In general, instances where this approach has been adopted entail the students undertaking real work (repair of faulty equipment, working on a farm, etc.), or some kind of fee paid to recompense for time lost (where students use company equipment during work time, under supervision).

Two factors limit the extent to which this approach is readily available - production needs, and safety. On the first point, student use of company machinery means - even where real work is being done - that there is a loss of production. Most firms can support such losses only to a very limited extent. Further, where the equipment TAFE wants to use is more advanced (and expensive), the probability is much higher that firms will also need to use the equipment more extensively, just to recoup their own investment (and the example of the printing company requiring its machinery to be in use 24 hours a day, seven days a week, is a graphic one). Concern over productivity is heightened where student use of equipment might damage the machinery, and lead to further production losses: not surprisingly, the degree of access to the equipment, and to actual use, was found to be a direct reflection of the risk of damage.

The second issue is that of safety. Many machines have rigid safety requirements, which may be incorporated in union awards over usage. Safety considerations, and the restrictions that these necessarily imply, limit access, and will continue to do so in the future.

From the viewpoint of both industry and TAFE, use of company equipment on a lease or loan basis is a short-term approach only. The potential costs are great, and other strategies should be sought in the long term.

Finally, there is already a great deal of use of industry personnel in TAFE, especially through part-time teaching. This option is met in many ways, usually without any conscious action by firms themselves. However, some do supply staff to assist in training, and often this is done free of charge. The need is to ensure that these arrangements continue in the future. A most important element of this must be to continue having a significant element of the teaching force comprising part-time teachers, recruited from industry. Such people are abreast of current technology and are a source of flexible response to need that is essential for the effective development and teaching of programmes.

Industry-owned training facilities

A far more valuable approach is to encourage industry to establish training facilities that are accessible to TAFE. As the options set out above suggest, this can be done in two ways:

- through industry having its own training facility, which can be used by TAFE on a paying basis, or through some kind of negotiated arrangement;

- through the establishment of joint training facilities.

Both these approaches have seen considerable development. Many large companies have training facilities in-house, especially those working in the more technologically-based areas, and in many cases these are available for TAFE use. Several instances were found of this, especially where a college had developed a long-term working relationship with that industry, and use of each other's facilities had become established practice.

More recently, many industries have seen value in setting up training facilities for across the industry use - especially where the individual enterprises are small, and in-house facilities unlikely. Often these turn out to be a tripartite development - involving industry, unions and government, with TAFE one part of the latter group. Industry skills centres have been established in all states, and many were examined in this study. They offer the basis for a long-term partnership between industry and TAFE that may be particularly rewarding.

In both cases, the significant inhibiting factor is cost. Training facilities, and especially high-technology equipment, are expensive, and their development has to be balanced against companies' concern to ensure profitability. Various approaches have been advocated to meet this concern, from taxation incentives when purchasing equipment to acquire additional machines for training use, through to offsets against levies (either payroll tax, or a new training levy).

Equally important, however, is the willingness of industry to take up training as a central concern. One observation made by several people interviewed, in TAFE and in industry, is that there is a greater awareness of the importance of training now, as compared to ten years ago. As such an awareness increases, and training becomes an established production cost - comparable with the cost of recouping capital investment in machines - so the concern over training facility costs will diminish. One of the effects of current commonwealth government concern over this issue is likely to be a greater appreciation of the truth of the observation that for most firms their major asset is their staff.

The final point to be made on this option, however, must be a reiteration of the importance of developing closer partnerships between industry and TAFE. While much interaction does take place, the scope for developing closer links is considerable. Out of a closer relationship, better appreciation of training needs, and more effective ways of gaining access to required facilities will flow, and this must be a priority for the future.

6. OPEN LEARNING

William Hall (1988)

"Open learning" is fashionable but the term is frequently not understood. It is an approach to learning which will be important if industry restructuring is to succeed. This extract is taken from part of a paper first published in the May 1988 edition of the Australian Journal of TAFE Research and Development.

OPEN LEARNING
William Hall

In this article William Hall explains what open learning is and what it is not, discusses some of the practical implications arising from a commitment to open learning, and suggests that if open learning is to succeed in Australia then there does need to be some co-ordination of effort.

INTRODUCTION

'Open Learning' is the latest jargon to be used by educationalists. It has a good sound to it, implying that learning (until recently) has been inaccessible to many, but that now it is available to everyone. On the other hand, there are those who claim that there is nothing new in open learning, that TAFE distance education (or external studies) has been operating as open learning for many years. There is some truth in both extremes but neither extreme encapsulates a full understanding of what is meant by the term 'open learning'.

From the start, let me make my position clear. I believe that in the past, too much of our education has been far too formal, existing primarily to satisfy the needs of the institution rather than the needs of the learner. Open learning, if it is properly implemented, is one important way to satisfy the learning requirements of (quite probably) the majority of students. I believe that unless our teaching becomes more open, TAFE is in danger of losing many of its present clients. They will go elsewhere and TAFE will be the loser.

OPEN LEARNING : WHAT IT IS

One of the best academic papers to discuss the meaning of open learning is by Lewis (1986). In that paper he points out that learners may be given choice in one or more of the following:

Why they learn	(i.e. the extent to which the motivation is their own)
What they learn	(i.e. the extent to which they construct their own content)
How they learn	(i.e. the extent to which they choose the methods and routes to suit their own ways of learning)
Where they learn	(i.e. the extent to which they choose the learning environment)
When they learn	(i.e. the extent to which they choose when to start, their pace and when to finish)
How their learning will be measured	(i.e. the extent to which they decide when to subject their learning to assessment, what sort of assessment and who will help them to carry it out)
Who can help them	(i.e. the extent to which they decide who is best placed to help and when)
What they do next	(i.e. the extent to which they decide what they want to do next, e.g. further courses, jobs)

An additional variable should be: *Which* students are eligible? In an open learning course, anyone can undertake the study regardless of where they live.

Consider a typical course in a typical TAFE college. A student must enrol by a fixed date, sometimes must have studied pre-requisite subjects, has to start attending set classes at a particular time, must complete the course according to a rigid timetable, must undertake the whole course regardless of individual interests or previous learning which has been completed and must sit an examination or pass some assessment. Using the check-lists in the following table, it can quickly be seen that most such typical courses are very closed indeed. The table is taken from an article by Freshwater (1986) where he discusses 'How open is open?'.

OPEN VERSUS CLOSED LEARNING FROM FRESHWATER (1986)

Closed	Open
1. FINDING OUT AND GETTING ACCESS	
Annual prospectus and leaflets.	Schemes marketed, information constantly updated and available to learners.
Numbers limited (e.g. by class size, etc.) or open to select few.	Open to all who need the programme.
Set entry requirements (e.g. examination results).	Self assessment and diagnostic arrangements to enable learning to be tailored to need.
Fixed enrolment (e.g. once or twice per year) and start times.	Entry to programme at any time, no administrative constraints.
2. WHAT	
Whole programme must be taken.	Learning tailored to need. Individual elements (parts) of the content can be selected.
No credit given for past experience.	Past experience recognised.
Learning objectives set in advance (e.g. by validating body or tutor).	Learner involved in formulating objectives or has free choice.
No guidance given to enable learner to decide what to learn.	Advice and help given to enable learner to decide what to learn.
Content of learning based on past skills and knowledge taught or what tutor decides is needed.	Content established by analysing learner job or speaking to practitioners to identify current and developing needs.
The tutor can only offer what he or she has produced.	The tutor can offer a variety of materials and uses those produced by others.
3. WHERE	
Learning only available by visiting Training Centre or College.	Learner chooses place (e.g. home, work etc. as well as Centre or College, if required).
Regular fixed attendance required.	Attendance only when learner requires it (e.g. for guidance or counselling).
Practical and experimental work require fixed periods of attendance at Centre, Workshop or Laboratory.	Practical and experimental skills can be offered through home kits, and open access to Centre, Workshop or Laboratory.
4. HOW	
Learning relies on constant face-to-face contact with tutor.	Learning can take place individually or remote from the tutor.
Only one method of learning offered, e.g. classroom instruction.	Choice of learning methods and learner activities.
Only one medium used (e.g. notes).	Variety of media used (e.g. tape, slides, text, etc.).
Learners are required to pace their learning to fixed timetable.	Learners decide the pace at which they will work.
Courses last a fixed time.	Courses end when learners achieve their objectives.

5. SUPPORT	
No guidance available during programme.	Advice, counselling and guidance, as well as tuition available if required.
Only teachers or specialist trainers are allowed to deliver/support the learning.	Support available at work, home, College or Centre, i.e. wherever it can be encouraged.
Support only available face-to-face.	Support can be by a variety of methods e.g. telephone, face-to-face, through discussions with colleagues or friends.
6. ASSESSMENT	
Annual formal examination only possible, external examinations extensively used.	Variety of assessment methods available, to reflect achievement during the learning programme for whole or part of course.
Assessment norm referred.	Assessment criteria and competency-based.
Assessment methods set by tutor.	Assessment methods negotiated with student.
No feedback on performance is given.	On-going feedback on achievement given to student.
Assessment dates are fixed and non-negotiable.	Learner decides when to be assessed.
Overall assessment only available.	Assessment possible for each module of course taken.

Most courses are not entirely open or entirely closed; they sit on a continuum:

Closed ◄——————————————► Open

Consider 'attendance' as one of the criteria. This can vary as follows:

Closed ◄——————————————► *Open*

Fixed attendance pattern; fixed classes at pre-determined times	Attendance negotiable at students' own convenience	No attendance required; student working wherever it is convenient.

The *definition* of open learning used by the Manpower Services Commission in all of its literature is:

> A term used to describe education and training schemes which are designed to meet the varied requirements of individuals — for example as to what, where, when and how they learn. Organisations make these freedoms of time, place and method possible by providing a carefully planned, flexible learning package. This enables the learner to study, for much of the time if necessary, away from the direct supervision of the trainer.

That is the definition favoured in this article.

7. ARTICULATED TRAINING: A MODEL FOR THE BUILDING INDUSTRY

Laurie Wallace, Hugh Guthrie, Geoff Hayton (1989)

The draft report Articulated Training: A model for the Building Industry contains sections on modular approaches to training and competency based training. These sections are reproduced.

Moving towards modular approaches

The keyword for appropriate course structures of the future is flexibility, and it has been suggested that this could be achieved more readily by a modular course structure with broad-based modules early in the course. (Hayton 1986, p.140; Hall & Hayton 1988, p.7.) Each module should be able to stand alone and be capable of being separately assessed. However, some modules will need to specify pre-requisite skills or modules. The structure should allow for multiskilling, multiple entry and exit points, and retraining (Hayton and Harun 1988). In short it maximises flexibility and enables programs to be developed which suit individual needs, the needs of individual organisations, whilst reflecting the range of training needed within an industry.

This flexibility is only possible if:

- the length of the course (or period of study) is not considered a major criterion of learning success;
- courses specify the competency standards to be achieved and the conditions under which the competencies are to be achieved (DOLAC 1988);
- courses can be developed, approved, accredited and reaccredited quickly.

TAFE and other formal award courses will need to allow for both vertical and horizontal mobility (e.g. between job levels and between academic awards or institutions). Such flexibility could mean:

- course structures which allow a greater range of choices in combinations of subjects or modules, including cross-disciplinary combinations across related disciplines (for example, the various elements of the mortar trades) and even across traditionally unrelated disciplines such as engineering, accounting and management;
- course structures which allow multiple entry and exit points and retraining;
- a restructuring of education towards administrative groups and courses based on industry groups or sectors rather than occupations;
- greater integration, articulation and accreditation between educational institutions and company-specific training and between the educational sectors of secondary, TAFE, advanced education and university (Parkinson, et al 1986; Higher Education: A Policy Statement. DEET, 1988).

This suggests that many courses, including those offered by TAFE and the CAEs and Universities, will require major re-organisation.

In addition to the major changes in training already outlined, there will be a greatly increased need for retraining in the building construction industry. The use of the term retraining in this paper is not meant to imply the discarding or changing of skills acquired through previous training, but rather the supplementation of existing skills with new skills through training.

This will require the industry to make a higher level of commitment to training (Hall 1987, 1988, A Changing Workforce 1988, Industry Training in Australia: The Need for Change, 1988). This need may be partly met by TAFE and other training providers offering specifically designed programs or modules from larger accredited courses. To meet the range of needs of people in the workforce, flexibility in course provision is required. Two types of retraining may be distinguished:

- courses which 'update' skills in cases where new technology or methods of construction are being introduced;
- courses which provide additional skills in a new area (including 'multi-skilling').

Both types of retraining will be required for the building construction industry.

The balance of the retraining need may be met by industry itself through a variety of training arrangements, including:

- in-house training using in-house trainers (both 'professional' trainers and skilled operators with a training role);
- in-house training using external trainers;
- off-site training funded by individual companies or industry organisations (e.g. MBCHAA, AFCC, BISCOA and the HIA).

Each may involve TAFE, the higher education sector or private training consultants in the planning of training (including training needs analysis and curriculum development) and/or delivery of training (Hayton et al 1988, Hall 1988).

Competency-based training and assessment

Competency-based training (CBT) has been implemented in various locations in Australia and overseas. The CBT approach has been discussed and advocated in a number of recent reports (e.g. DOLAC, 1988; DEET 1988).

It has been variously labelled as:

- competency-based training;
- competency-based training and assessment;

- competency-based education;
- competency-based vocational education;
- standards-based training;
- criterion-based training;
- self-paced learning.

Each has a particular emphasis and opinion differs on what constitutes the essential features of this approach (Harris et al 1989). The DOLAC (Departments of Labour Advisory Committee) report entitled: 'A discussion paper on competency-based trade training' identified three essential features:

- identification of all the skills involved in an occupation and of the specific mix of skills, knowledge and attitudes required for recognition in a specific occupation;
- instruction to achieve those skills;
- methods of assessment and certification on attainment of those skills. (DOLAC 1988, p.12.)

A similar definition is offered by Parkinson in 'A glossary of terms used in TAFE':

> 'Competency-based education is an educational system that emphasises the specification, learning, and demonstration of those competencies (knowledge, skills, behaviours) that are of central importance to a given task, activity, or career'. (1986, p.32).

Norton (1980, reported in Harris et al 1984, p.5-6) provides a comprehensive framework for CBE which lists five essential and seven desirable features, and these are listed in Table 3.1.

Experience in Australia suggests that all three of the features listed by DOLAC (1988) and Parkinson (1986) must be included for success (Harris et al 1987). For example, competency-based training without competency-based assessment has been found to be less effective. Thus the term 'competency-based training and assessment' incorporates two of the three essential features, but in this report this term may be considered to have the same meaning as 'competency-based training'.

Competency-based training is viewed rather differently by different people in different positions. Each individual highlights those aspects considered to be of significance to them; the employer underscores different advantages compared to the trainee/student, educational administrator, instructor, and government body.

Two questions which are often asked are:

- What are the educational or administrative advantages of the competency-based approach?
- What are the potential disadvantages or difficulties?

In the context of this present study, an important advantage of CBT is its tendency to support other educational and administrative changes such as modular course structures.

TABLE 3.1 ESSENTIAL AND DESIRABLE CHARACTERISTICS OF COMPETENCY-BASED VOCATIONAL EDUCATION PROGRAMMES (Adapted from Norton 1980 and reported in Harris et al 1984).

A	ESSENTIAL CHARACTERISTICS:	
	1	Competencies to be achieved by the students have been identified through occupational and training needs analysis.
	2	Criteria for assessing each of the verified competencies have been explicitly stated along with conditions.
	3	Instructional programme provides for the individual development and individual assessment of each competency.
	4	Assessment of the students'competency requires actual performance of the competency as the major source of evidence, taking knowledge and attitudes into account.
	5	Students progress through the programme at their own rate by demonstrating their competence.
B	DESIRABLE CHARACTERISTICS	
	6	Instruction is individualised to the maximum extent possible.
	7	Learning experiences are guided by frequent feedback
	8	Emphasis is upon student's achievement in exit requirements.
	9	Instruction is individually paced rather than time-based.
	10	Instruction is field-centered using realistic work situations and actual on-the-job experiences.
	11	Instructional materials are: . modularized; . mediated; . flexible with both required and optional learning activities provided.
	12	The instructional programme as a whole is carefully planned and systematic-evaluation data are used for programme improvement.

Other advantages suggested in the literature include:

- a movement away from the notion of time-serving and towards achieving measurable skills and abilities in minimum but appropriate time-frames;

- a reduction in the time before which some people, at least, are full and productive members of the workforce;

- the attributes of "competence" lead to a more precisely defined assessment system which, in turn, means that competencies already achieved can be given appropriate recognition and that employers, trainees and educators alike understand the goals which need to be striven for;

- the elimination of essentially artificial differences between states leading to the more ready transfer of trainees and qualified people;

- the ability to make more precise and uniform judgements about what constitutes the achievement of competency and, hence, the achievement of nationally based standards;

- the movement towards a more modularised approach with clear but flexible and open entry and exit points which are capable of adaptation to meeting individual needs;

- the movement towards a programme of instruction based rather more on the needs of individuals and rather less on the perceived needs of the majority of 'average' students;

- the greater consultation between TAFE, industry and government which will be the inevitable consequence of trying to define the competencies needed and developing methods for judging their achievement both on- and off-the-job.

The disadvantages or potential difficulties include:

- the development of a potentially ponderous and expensive system for administering and recording the listing of competency;

- a potentially narrow interpretation of what constitutes the attributes needed for an individual to be competent. (The assessment system may (for example) tend to concentrate on things which can be readily measured at the expense of important but less easily measured attributes.);

- the maintenance of (sometimes artificial) differences between states/territories on the knowledge, skills and attitudes needed to establish competency;

- the perceived resource implications for TAFE and industry of setting up and running programs which are individualised to a greater extent than at present;

- the varying ability and willingness of employers to provide training and test for competency on-the-job;

- the resistance by educators and industry to changes in the system of assessment - i.e. moving towards a competency-based or standards-based approach;

- the need to restructure awards to allow for completion of training in under the time suggested in traditional time-served approaches.

Various committees and working parties since 1982 have been discussing and suggesting the need for a greater emphasis on competency in apprenticeship training. For example, the report of the COSTAC Working Party on Kirby recommendation 33 (DEET, 1988) recommended that successful completion of a standards-based technical education course should be a prerequisite for trade qualification. A discussion paper on Competency-Based Trade Training was published in 1988, which:

- identified the need for and potential benefits of moving the trade training system to a competency basis;

- identified components of such a system;

- proposed a framework for the development of a competency-based system;

- addressed a number of resource and legislative/administrative issues; and

- suggested a timetable and process for implementation, recommending it as a matter of "high priority" and for "substantial implementation" to occur by 1994. (DOLAC 1988; Harris et al 1989.)

For trade training for the building construction industry, a simple form of competency-based training has been introduced in Western Australia for both on- and off-job training. Also, competency-based trade training has been introduced in New Zealand and other countries. With respect to non-trade, post-trade and paraprofessional training, very few competency-based programmes have been implemented in Australia.

8. THE SCHOOL OF HARD KNOCKS

Peter Thomson (1988)

Appropriate experiential learning should be recognised by formal course providers and by accrediting agencies. A study on the assessment of experiential learning was published by the Centre in 1988. This extract is taken from the summary report.

1.0 LEARNING FROM THE SCHOOL OF HARD KNOCKS

1.1 Experiential Learning Defined

The saying 'Experience is the best teacher' provides the framework for what follows. Our interest is in the learning which comes from living and working — part of the process we call 'experience'.

The technical term to describe the outcomes of this process is EXPERIENTIAL LEARNING which is defined as:

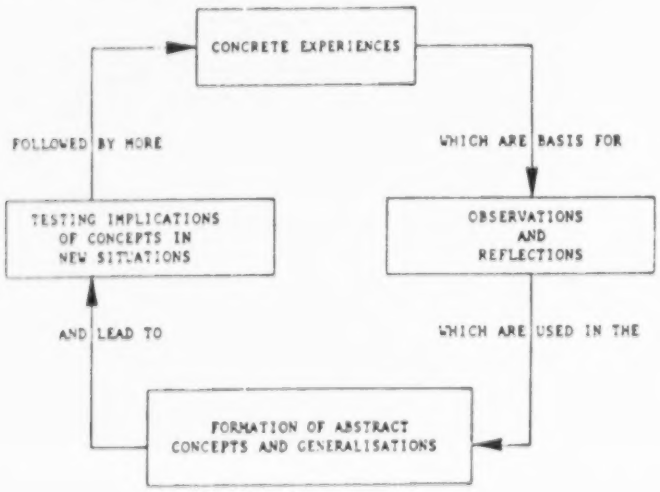
> the attributes of knowledge, skill and attitude which are acquired through life and work experience.

This, however, is a broad definition and it needs to be broken down into its two main components. The first is non-sponsored learning, that is learning acquired informally and independent of a training or educational institution. This is also known as 'learning through life experience', or more colloquially, 'learning from the school of hard knocks'.

The second broad category is sponsored learning. This is learning formally incorporated into institutional programs designed to give students more direct experience in integrating and applying knowledge. Examples are practical work or work experience done as part of a course.

1.2 The Experiential Learning Cycle

Experiential learning relies primarily on concrete experience, observation and reflection. The learning can therefore be time-consuming as the experiences, observations and reflections must be repeated often enough to allow the development of concepts and generalisations which can be tested in new situations. However, once the process is completed, what is learnt by this method is not easily forgotten. This cyclical process can be summarised by a diagram.


CONCRETE EXPERIENCES
FOLLOWED BY MORE
WHICH ARE BASIS FOR
TESTING IMPLICATIONS OF CONCEPTS IN NEW SITUATIONS
OBSERVATIONS AND REFLECTIONS
AND LEAD TO
WHICH ARE USED IN THE
FORMATION OF ABSTRACT CONCEPTS AND GENERALISATIONS

It is a characteristic of experiential learning that many people do not fully appreciate how much they have learnt. This is particularly true of people unfamiliar with the workings of the academic system.

1.3 Gaining Exemption rather than Selection for Adults

We are not much interested in experiential learning that can only be used for entry into a tertiary course. In Australia it is now fairly commonplace for tertiary institutions to set aside a small number of places for 'mature-aged entrants'. There are a variety of these schemes in existence, but none, to the author's knowledge, involves the assessment of the applicants' experiential learning. Mature-age selection is usually based on such things as entrance tests (which assess 'general ability'), essay assignments ('Why I Want to Return to Study') and interviews. Of course, selection issues cannot be entirely ignored because, although the sort of people we are considering seek exemptions, they must first get over the selection hurdle.

The people who are of interest to us are those for whom entry into the course is not in question. The only question to be answered is how much credit should be given for their experiential learning.

Although it is not drawn out as a major issue in the study, it is generally implied that the experience referred to is in some way related to age. Individuals with the types of experiences that we will be looking at tend to be adults, and therefore the learning associated with experience is largely, though not exclusively, the province of adults.

1.4 Focus of Study

In summary therefore, the type of experiential learning on which we will be focusing:

- has been acquired informally through life and work experience and is not something gained from an institutional program of education or training;
- is being assessed for the purpose of gaining exemption from part of a course and not simply to gain entry into that course; and
- is more typically associated with adults than young people.

2.0 EQUITY AND COST-BENEFIT CONSIDERATIONS

Australia's tertiary institutions and licensing authorities which control the right to work in various trades and professions have largely ignored the need for procedures and processes which give formal recognition of a person's previous experience in life.

SUMMARY OF ASSESSMENT PROCEDURES FOR EXPERIENTIAL LEARNING

. The assessment process uses an assessment panel which consists of people with recognised expertise.

. The panel members have been trained in the techniques of assessing portfolios and interview performance.

. The same panel assesses both portfolio and interview performance.

. Assessment of portfolios involves:

  - checking relevance of competencies claimed against course outcomes;

  - classifying work presented against rating scales, using a set of exemplars whenever possible.

. Assessment of interview performance is done using a structured interview and checklist.

. Provisional exemption is granted by the assessment panel.

. Assessment of performance continues on the job during the period in which provisional exemption has been granted. This is done mainly through the use of a log book to record competencies which are then attested to (where appropriate) by the supervisor.

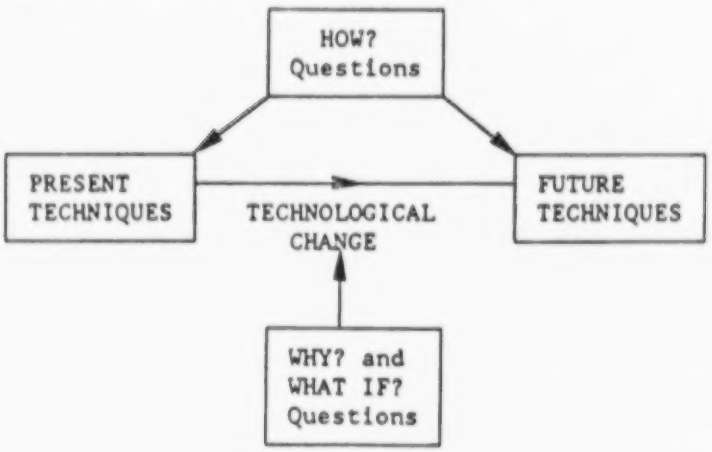
. Other assessments may be specially designed when the applicant is in the field. For example, performance assessments, oral tests etc.

. Exemption is ratified on the basis of successful progress through all the above stages.

9. TEACHING THE SOCIAL IMPLICATIONS OF TECHNOLOGICAL CHANGE

William Hall (1988)

The extract lists the reasons why the social implications of technological change should be included in technical courses. The full report describes a number of curriculum models, including the following:



Teaching the social implications of technological change matters if students are to have an understanding of what is happening and why it is happening. Teaching the social implications should be a part of the educative process. Unfortunately, the "Why?" and "What if?" questions seem to be generally neglected. Such neglect cannot be justified and is especially a matter of concern in these days of rapid technological change.

1. WHY TEACH SOCIAL IMPLICATIONS?

DEFINITIONS

By the "social implications" of technological change, I mean the ways in which technological change can affect people (individually or in a group) and the ways in which people can themselves bring about such change. Technology can be defined as 'a disciplined process using scientific, material and human resources to achieve human purposes' (Harrison 1986). (This is the definition adopted by Project Technology in the United Kingdom and is further explained in Section 3 of this report.)

REASONS FOR TEACHING SOCIAL IMPLICATIONS

Some years ago I gave eight main reasons for teaching the interactions of science, technology and society in high schools (Hall et al. 1983). Six of these reasons are equally relevant to TAFE (the other two are specific to schools) and two others have been added:

- technological change is an important part of our culture and, as such, should be understood by everyone;
- it is important to have informed citizens in all walks of life;
- there is a widespread concern for the quality of life, especially the impact of changes to technology on this quality;
- there is a need for everyone to exercise social responsibility at work when technologies change;
- there should be a 'values' component in technical education. This is especially true when dealing with technological change;
- there needs to be recognition that changes in technology are practised within a social context and so the teaching of changes should not be isolated from people;
- technological change is having a huge impact on employment, with an ever increasing rate of change;
- technological change is making an impact on education (both what is taught and how it is taught).

10. THE CONTINUING EDUCATION NEEDS OF ACADEMIC STAFF: FULL-TIME TAFE LECTURERS

William Hall (1987)

Three parallel, national, studies into the initial and continuing education needs of full-time TAFE college lecturers and senior administrators were completed in 1987. These extracts are taken from one of these studies. The study indicated the urgent need for staff development programmes so that lecturers can regularly update their technical/vocational knowledge and skills.

The main findings of the study are that:

- there is an urgent need for continuing education programs which enable lecturers to update their technical/vocational knowledge and skills in their teaching areas, and there is an urgent need to provide ways in which lecturers can keep abreast with technological change. Over 90% of all colleges recognised these as severe or important problems;

- there is an urgent need to institute continuing education programs which bring lecturers into close contact with industry/commerce. The general picture is that in most colleges such close contact (for continuing education purposes) does not exist;

- attendance at in-service courses mounted by staff development units is the most common approach to continuing education. Most of these courses are 'in-house' (conducted by and/or in TAFE);

- a professional network linking industry/commerce with individual TAFE college staff is essential if there is to be close college liaison with industry/commerce;

- higher education caters very little for the technical/vocational continuing education needs of TAFE lecturers;

- the continuing education needs of trades lecturers are especially acute because there are usually no formal higher education courses for such lecturers within Australia;

- the administrative structure of a college and the college management are important factors in determining staff development provision, and developing an atmosphere condusive to continuous informal staff development.

Two ways to satisfy professional development needs are:

(a) to provide small research and development grants to TAFE colleges for those industrial/commercial areas represented in TAFE colleges;
(b) to release lecturers so that they can spend regular periods in industry/commerce.

The results of Questionnaire A show a general national picture in which:

- most colleges believe that the following are severe or important problems:
  - the need to update technical/vocational knowledge and skills in the area of teaching specialisation (93%);
  - the need to keep abreast with general technological change (90%);

- at least one half of the colleges believe that the following is a severe or important problem:
  - the need for management skills of people (63%);

- the following were either minor problems or not considered to be a problem for at least half of all colleges:
  - the need to learn skills of curriculum development (57%);
  - possessing insufficient administrative skills (53%);
  - the need for student counselling skills (67%);
  - understanding the nature of TAFE (75%);
  - the need for skills in dealing with equal employment opportunity (71%);
  - the need for management skills of the educational process (51%) (note that 45% thought this an important problem);
  - geographical location of college (63%) except for country colleges where just over half stated that this was a severe or important problem;
  - the need to update knowledge of the community (58%).

It is clear that there is an urgent need for continuing education programs which enable lecturers to update their technical/vocational knowledge and skills in their teaching areas, and that there is an urgent need to provide ways in which lecturers can keep abreast with general technological change.

Questionnaire B asked colleges to indicate which ways had been used within the past three years to assist the staff with continuing education needs. The results for all states/territories are shown in Table 4.3. As with Questionnaire A, responses were analysed state by state, metropolitan colleges were separated from country colleges and small colleges from large colleges. The only differences worth noting are shown as exceptions in the generalisations which follow Table 4.3.

The results of Questionnaire B show a general national picture in which:

- the most common approaches to continuing education are personal reading, membership of trade/professional association, liaison with industry/commerce (52% have a major involvement in these areas); and attendance in in-service courses mounted by TAFE Authorities (61% major involvement). It is interesting that there was no difference between metropolitan and country colleges so far as these most common approaches were concerned, except that more New South Wales country colleges had a minor, rather than a major, involvement with personal reading, etc.

- attendance at workshops, seminars, conferences organised by industry/commerce (94% had some involvement) and formal higher education courses (93% involvement) were the next most popular approaches to continuing education.

- the approaches never used by most colleges were
  - industrial/commercial release programs by the TAFE college with pay (52%)
  - industrial/commercial release programs by the TAFE college without pay (80%)
  - exchange programs between TAFE college and industry/commerce (83%)
  - industry/commerce personnel working in TAFE college (57%)
  - applied (technological) research conducted within the TAFE college and funded by the college (80%) and funded by outside bodies (75%)
  - staff exchange (72%).

Colleges had minor involvement in

- brief, occasional observational and/or work experience visits to industry/commerce (60%)
- study leave (46%)
- secondment of lecturers to undertake special projects (53%)
- private practice by TAFE lecturers (49%)
- lecturer membership of course planning teams (45%)

There was also some major involvement in these approaches.

In general, New South Wales country colleges had slightly higher percentages for 'never used' approaches than those for all other colleges. Nevertheless, this did not bias the results.

It is clear that the approaches to continuing education which could meet the urgent needs revealed in Questionnaire A are not being employed by most colleges. There are good reasons why these are not occurring and some of these are discussed in this report. Nevertheless, ways must be found to overcome these difficulties if TAFE lecturers are to maintain essential skills and knowledge. Therefore, it is <u>recommended</u>

> that, as a matter of urgency, heads of staff development units meet to explore ways in which TAFE full-time lecturers can regularly update their technical/vocational knowledge and skills.

These ways could include:

- an analysis of how a college is structured to strengthen its TAFE/industry links;
- approaches to releasing staff to work in industry/commerce;
- approaches to encouraging applied research and development;
- approaches to involving industry/commerce in college continuing education activities.

11. MARKETING TAFE: EFFECTIVE PUBLIC RELATIONS AND MARKETING FOR THE TAFE SYSTEM

Peter Cutter, Diana MacRae, Michael Oliphant, Tina Scott (1988)

The Centre commissioned a group at the Box Hill College of TAFE to write a marketing handbook for TAFE colleges. The handbook contains examples of successful projects and a checklist. This extract is taken from the first part of the book.

MARKETING TAFE

Effective Public Relations and Marketing for the TAFE System

SECTION A: Marketing for TAFE

An overview of marketing theory, with particular application to the TAFE sector.

This section emphasises the identification of corporate image and establishment of an entrepreneurial environment.

1. INTRODUCTION
2. IDENTIFYING THE MARKET
3. PLANNING THE MARKETING MIX
4. DEVELOPING A STRATEGY PLAN
5. ESTABLISHING AN ENTREPRENEURIAL ENVIRONMENT

1. INTRODUCTION

1.1 Rationale

More than any other sector of education and training, TAFE has a critical role to play in developing the workforce skills necessary for the Australian economy. Federal and state government policies explicitly require TAFE to deliver the required training outcomes.

While states differ in their patterns of TAFE governance and organisation, TAFE throughout Australia is judged on **perceptions** about its performance. Unless TAFE systems and providers are perceived to deliver the required training outcomes, they may be bypassed in funding and industry support.

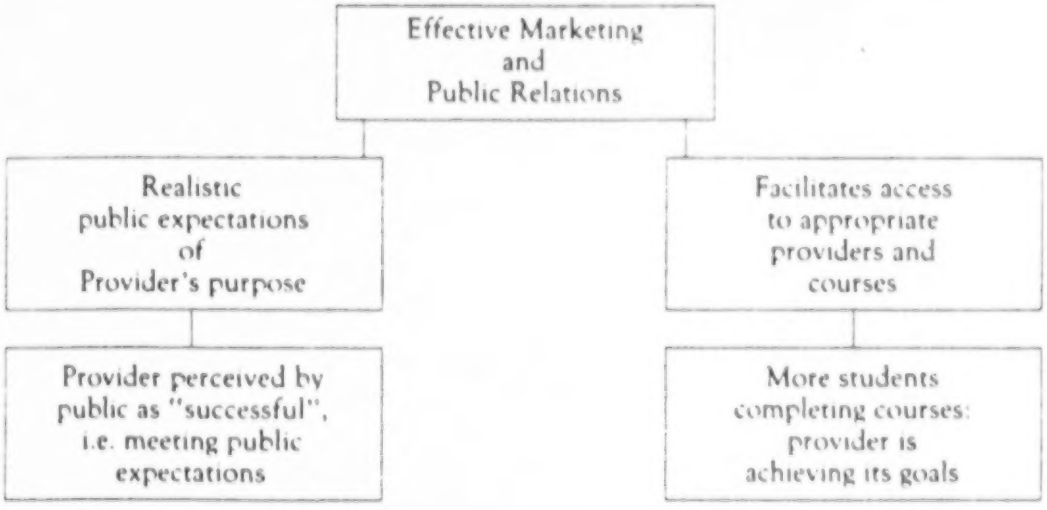
Marketing and public relations are concerned with reporting achievements, promoting opportunities and directing perceptions.

A variety of marketing techniques can publicise TAFE's capacity to satisfy training demand. Public relations strategies can ensure that the success of TAFE operations is known to government funding agencies, industry and the community.

Government funding limitations and growing demand for trained personnel in industry point to increasing private sector involvement in education and training. Colleges which market effectively will attract the greatest private sector support, including industry-funded training contracts.

Most providers deliver excellent education and training programs. However, it is important for **all** to communicate the availability and excellence of their product to the marketplace, thereby enhancing their public image. Table 1 summarises the advantages of integrated marketing and public relations for TAFE providers:

Table 1: EFFECTIVE MARKETING & PUBLIC RELATIONS


Effective Marketing and Public Relations
Realistic public expectations of Provider's purpose
Facilitates access to appropriate providers and courses
Provider perceived by public as "successful", i.e. meeting public expectations
More students completing courses: provider is achieving its goals

The purpose of this handbook is to provide ideas, techniques and options to help colleges establish and maintain their marketing and public relations programs. Marketing strategies will be most successful when there is:

(a) an institution-wide climate which:
- encourages individuals and groups to adopt a positive public profile;
- facilitates a network of key client groups which is aware of and supports college activities;

(b) a cohesive focus for marketing and public relations so that the image conveyed to the public is consistent with organisational purpose, goals and operations.

(c) the allocation of appropriate resources:
- time and commitment of senior management;
- designated, specialist staffing of the marketing and public relations function;
- financial and facilities support.

1.2 Definition

Marketing is the process by which an organisation can identify and meet client needs. It involves finding and exploiting a place in the market: by having the right product in the right place, at the right price and with the right promotion.

Public relations is the management of relations between an organisation and its publics. Its **purpose** is to achieve understanding and goodwill. The **process** involves positive communication to ensure the perceived image reflects the organisation's strengths.

To make TAFE visible to its constituencies, and to gain optimum appreciation and support, marketing and public relations should be seen as complementary. Marketing makes available the programs, facilities, services and expertise of the provider; public relations promotes these products and highlights achievements.

Within the TAFE sector, three areas require marketing and public relations:

(a) **Corporate Image**
Every organisation and system has a corporate image. TAFE systems, and individual providers, need to identify what they want their corporate image to be, and to develop public perceptions accordingly.
Each provider has its own strengths or areas of expertise which distinguish its position in the marketplace. By promoting its purposes and goals, a TAFE provider gives the public realistic, positive expectations of the institution and the TAFE sector.

(b) **Fee-for-Service and Commercial Activities**
Self-funded and entrepreneurial activities are increasingly important for many TAFE providers. Promotion of these programs and services requires an integrated marketing program:
- assessing need and demand;
- developing appropriate programs and services;
- setting the right price, and arranging the right time and place for delivery;
- promoting the activities.

Successful completion of these activities contributes positively to the development of corporate image. It is important to report such successes.

(c) **Government-funded Programs**
Marketing of mainstream, government-funded programs chiefly requires "promotion" or communication of full program particulars. (Product market identification has occurred during the curriculum development process, and the price, time and place of delivery are usually determined by government policies). It involves letting the public know which programs are available, where, when and at what cost.
Promotion and information provision for government-funded programs are provider **and** system-wide responsibilities.

2. IDENTIFYING THE MARKET

2.1 Corporate Identity

The corporate identity is a provider's perception of itself within the post-secondary sphere – high tech, community-based, mono-purpose, regional etc. The corporate identity (image) should be integral to the provider's promotional material, so that it is effectively and consistently conveyed to the public. So, how the public sees the provider, its products and services, will reflect the promotion of that image. **It is to the image that people respond, not necessarily to reality.**

Each provider should assess its Mission and Charter to establish its desired corporate identity. It should then analyse how it is currently perceived and determine how to convey the desired corporate identity to the public.

A market audit will help to establish the corporate identity and identify a position in the marketplace. Firstly, it looks at the external environment to identify market opportunities, i.e. training and other needs for which there is no existing product, and changes which may reduce demand for current products. Then it looks at the internal environment, in this case the TAFE provider, in order to identify areas where there is potential to develop or expand the range of products and services to meet identified market opportunities.

Existing mission statements and organisational objectives can be valuable resources when carrying out a market audit. The following checklist sets out a number of external and internal factors which should be considered as part of that audit:

Table 2: MARKET AUDIT CHECKLIST

External Market Environment

Some factors to consider:

- Demographic — population trends
- Economic — inflation, wages, the dollar
- Ecologic/Technologic — e.g. any major breakthrough
- Political — change of government, new policy
- Cultural/Life Styles — e.g. more leisure time

Each factor may impact in a variety of ways, so in the market research phase consider the following:

- Target Markets
  - — individual students
  - — industry and commerce
  - — government agencies and departments
- Competitors
  - — other institutions
  - — private training organisations
- Funding Source
  - — government
    - — recurrent allocation
    - — special purpose grant
  - — private
    - — individual fees
    - — business/corporate
    - — trusts and foundations

Internal Market Environment

Evaluate existing organisational objective(s) in terms of both the external environment and internal resources, including:

- Effectiveness of organisational structure
- Expertise of management and staff
- Buildings and facilities
- Financial resources and funding
- Range of courses available
- Accessibility: level of fees, pre-requisites, support systems.

Market Opportunities

Establish the corporate identity, organisational objectives and products which can take advantage of the opportunities offered by a dynamic external environment and maximise the potential of the provider's resources.

2.2 Target Market

A market audit identifies a number of areas where a provider is able to offer products or services to meet perceived needs. Analysis of the target market will provide more specific information about the client group.

Most TAFE activities are intended for specific groups or target markets, and identification of the customer will ensure that the activity is tailor-made to meet requirements. For example, a program to train sewing machine operators may need to be adapted to meet the needs of a non-English speaking group.

The nature of the target market - style, status and aspirations - should be considered when promotional campaigns and support materials are being prepared. These should be suited to the image which the provider wishes to project to that target group.

A market can be **segmented,** or broken into different target groups, in a number of ways. The following table lists groupings which are most likely to apply in TAFE, with examples of the issues to consider when preparing for various target markets.

Table 3: TARGET MARKET SEGMENTATION

Segmentation	Example of Issues for Consideration
DEMOGRAPHIC	
Age	Exit year 11/12 or mature-age for entry
Sex	Non-traditional programs for disadvantaged groups
Nationality	Special assistance needed to enter mainstream programs
Prior education	Initial vocational or recurrent education
Income	Will high fees be a deterrent?
Family life cycle	Timing of classes to fit family and business commitments
Occupation	Availability of programs for shift workers
SOCIOGRAPHIC	
Social class	Government social justice policies
Life style	Interest in recreational short courses
Aspirations	Further vocational training
BEHAVIOURISTIC	
Loyalty	Satisfied "customers" may return
Attitude	Good marketing can improve public attitude
INSTITUTIONAL	
Industry/commerce	Special programs for technological change
Schools	Good relationships with feeder schools

3. PLANNING THE MARKETING MIX

Once a broad area of need has been established for a specific target market, consideration should be given to the marketing mix. That is, getting the right **Product** at the right **Price**, in the right **Place** with effective **Promotion** - the "4 P's" of marketing.

3.1 Product

TAFE providers have the capacity to do a great deal more than simply offer accredited preparatory and vocational programs, and a few short hobby courses.

Marketing is about identifying and meeting consumer needs. An entrepreneurial approach will expand a provider's capacity to meet these needs while generating new income, and allow a more effective use of existing resources.

Many providers have established links with industry and community groups through various advisory committees and councils. These links should be used to provide feedback on emerging education and training needs. Institutions need to take a pro-active role in anticipating training needs which may emerge as a result of structural changes within industry, new government policies and changing expectations of society.

Product quality is vital to the continuing success of individual providers and the TAFE sector. Word-of-mouth remains the most effective single means of publicity. Consultation during initial product development is important to ensure the product meets customer needs; and evaluation checks whether the product did meet customer expectations.

Most products and courses enjoy a life cycle covering introduction, growth, maturity and decline, with demand often building quickly in the early stages, peaking, then gradually reducing. Therefore providers should constantly be alert to product opportunities so these remain attractive to client groups.

3.2 Price

The price set for a product is a major factor in determining customer expectations and perceptions of that product, as well as the market segments which are financially able to access the product. Providers should look to setting prices which are not only realistic in terms of the cost of the course to the provider, but reflect the economic capacity and quality expectations of the target market.

The Product Development section of this handbook looks at pricing in more detail, including the issue of interfacing pricing levels with provider policies.

3.3 Place

Both the place and time of delivery can maximise the accessibility of the product to the targetted group, as well as reinforcing client expectations of the product. Offering a course at a time or venue appropriate to the needs of the target group may contribute more to increased enrolments than course redevelopment to tailor content to their needs. For example, a short course on negotiation skills may better meet the needs of upwardly mobile young executives in an early morning, breakfast timeslot than early evening when work commitments may restrict attendance.

In-house industry training programs are a means of taking your product to the marketplace. Students' travelling time is reduced, and instructors may gain access to state-of-the-art technology. Such programs also build or reinforce links with industry.

The venue of a course will affect not only accessibility but customer expectations, particularly with regard to quality. Consider moving courses off-campus: to a more prestigious location when targetting private enterprise; to a less institutionalised venue when targetting disadvantaged groups.

3.4 Promotion

Promotion is the component of marketing which ensures that potential customers know of the product, and are motivated to participate or purchase. It covers the whole spectrum of public relations, publicity and advertising. A range of options and strategies are contained in this handbook.

The most effective approach to product promotion will to some extent be determined by how well the product genre is established in the marketplace. When launching an entirely new product, you need to inform potential customers of the product, then convince them that the product satisfies a need, and motivate them to purchase.

Promotion is the responsibility of every member of staff. However, many aspects of promotion require specialised skills, contacts and funding.

A provider committed to establishing a high public profile should identify and allocate appropriate personnel and resources for the marketing/PR function. This ensures that promotion of the institution and its products is consistent and cohesive, and has a high priority. As competition for media coverage increases and more colleges try to establish themselves as competitive forces in the marketplace, a professional approach to promotion is critical.

4. DEVELOPING A STRATEGY PLAN

A strategy plan will guide the provider's total marketing/public relations program for a stated period. However, setting of objectives, resourcing, implementation and evaluation apply equally to each of the various strategies and activities which make up the overall program. Table 4 sets out the factors which should be considered in each of the four phases of the marketing program.

Table 4: DEVELOPING A STRATEGY PLAN

1. **Objectives**
   - What does the institution wish to achieve?
   - Can these be quantified to assist with evaluation?
2. **Resourcing**
   - Where in the organisation could the marketing/PR function be situated?
   - Does the officer have adequate authority and responsibility within the organisation?
   - Does the plan have the support of management and staff, and appropriate lines of communication?
   - Have appropriate levels of support been made available, in terms of both financial and personnel allocations?
3. **Implementation**
   Promotion of the institution should include:
   - A consistent, eyecatching advertising format to maximise impact.
   - Establishment of personal contact with media to maximise exposure.
   - Establishment of links with industry, commerce and government.
   - Maintenance of good relations with feeder schools.
   - Organisation of a range of events to heighten public awareness of the institution.
4. **Evaluation**
   - A vital step which provides feedback on the success of promotional campaigns, as well as valuable information to assist with future planning.

5. ESTABLISHING AN ENTREPRENEURIAL ENVIRONMENT

An institution with an outward-looking, entrepreneurial marketing orientation will be constantly alert to new opportunities, while evaluating the effectiveness of present programs.

All marketing and public relations activities should establish and reinforce the organisation's "state of mind" about corporate image. The support and enthusiasm of Council, management, staff and students in identifying and reinforcing the image is critical. Council-endorsed policies on marketing and entrepreneurship may act as a focus for discussion, leading to institution-wide support.

Changing demographic, economic and social trends are radically altering the outlook of the TAFE system. In addition to fulfilling traditional responsibilities, the TAFE sector will be forced to define and develop alternative resources and markets. Colleges will need to develop and project an image which reflects this proactive outlook.

In particular, college councils and senior management need to make a commitment to expanding TAFE operations beyond the traditional. A positive approach to new organisation goals which include entrepreneurial activities is necessary if TAFE is to deliver the education and training needed by Australians and Australian industry.

By adopting a corporate, enterprising approach, institutions reinforce public support and trust in the entire government education system, as well as increasing their own local image. The corporate image will promote the college and the system to which it belongs.

12. PERFORMANCE INDICATORS

Hugh Guthrie (1988)

In recent years there has been a strong push for the use of performance indicators by TAFE systems and colleges. A Centre monograph on performance indicators examined:

- graduate success rate;
- student and industry satisfaction with program provision;
- participation rate according to demographic group;
- recurrent costs per subject per student; and
- average teaching hours per full-time TAFE lecturer.

This extract develops a model.

THE ROLE OF PERFORMANCE INDICATORS

Why use performance indicators? The balancing of the moral and the pragmatic dimensions clearly indicate that the "benchmarks" which might be used to compare performances would shift according to the position of the appropriate balance point. Like programs might be compared with like, but comparing the performance of an access program for Aboriginal people in remote areas with the performance of a major city-based trade course would clearly have problems.

Performance indicators relate to the way in which TAFE does what it does. Most of TAFE's activity is based on identified or "perceived" needs. These needs generate "objectives". Objectives lead to "strategies" being put in place. These strategies have "outcomes" (Figure 1).

This is a linear planning process. Naturally in "real life" this linear process has a number of feedback loops and I will describe some of these shortly.

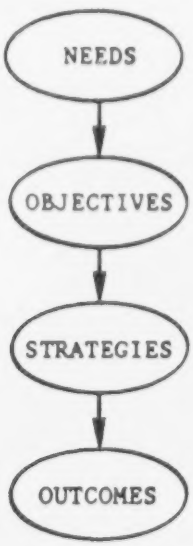


Figure 1

Once some sort of strategy is in place the development of appropriate activities can occur. The strategy might, for example, be a curriculum document or a plan to provide training and retraining for an industry. Thus strategies have "activities" or "doing" things associated with them. These activities have "inputs" and give rise to "outputs" (Figure 2). Inputs are defined by Birch and Latcham (1985) as all the variables entering the system - for example:

- students - their knowledge, skills, aptitudes, attitudes, motivations and expectations at entry;
- staff - academic, administrative, technical - their competencies, experience, attitudes, motivations and expectations;
- money - the funds committed to or earned by the system; and
- physical facilities - buildings, books, equipment etc.

Outputs are defined (Henderson, 1987) as events, objects or services generated by program activities. He defines outcomes as the effect, the impact, which the outputs are intended to exercise on the original need or problem. Thus outputs might be considered as indicators of the extent to which some of the desired outcomes have been achieved, given the original need or problem. Outputs and outcomes are therefore related.

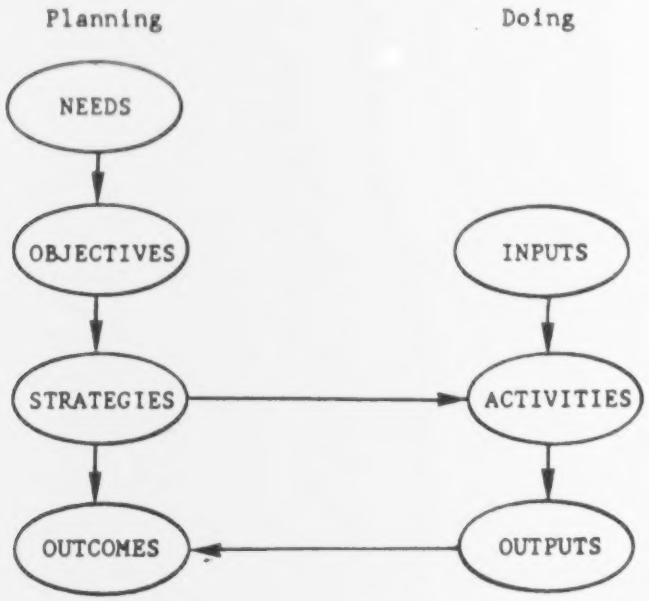


Figure 2

The relationship between inputs and outputs is used in the development of efficiency measures. Efficiency measures are usually relatively easy to quantify and hence are useful as gross comparative measures. The relationship between objectives and needs helps to determine the appropriateness of an activity or strategy. Finally, the relationship between the outcomes and objectives gives an indication of program effectiveness (Figure 3). Ideally, performance indicators are concerned with measuring the efficiency, effectiveness and appropriateness of programs, activities or strategies.

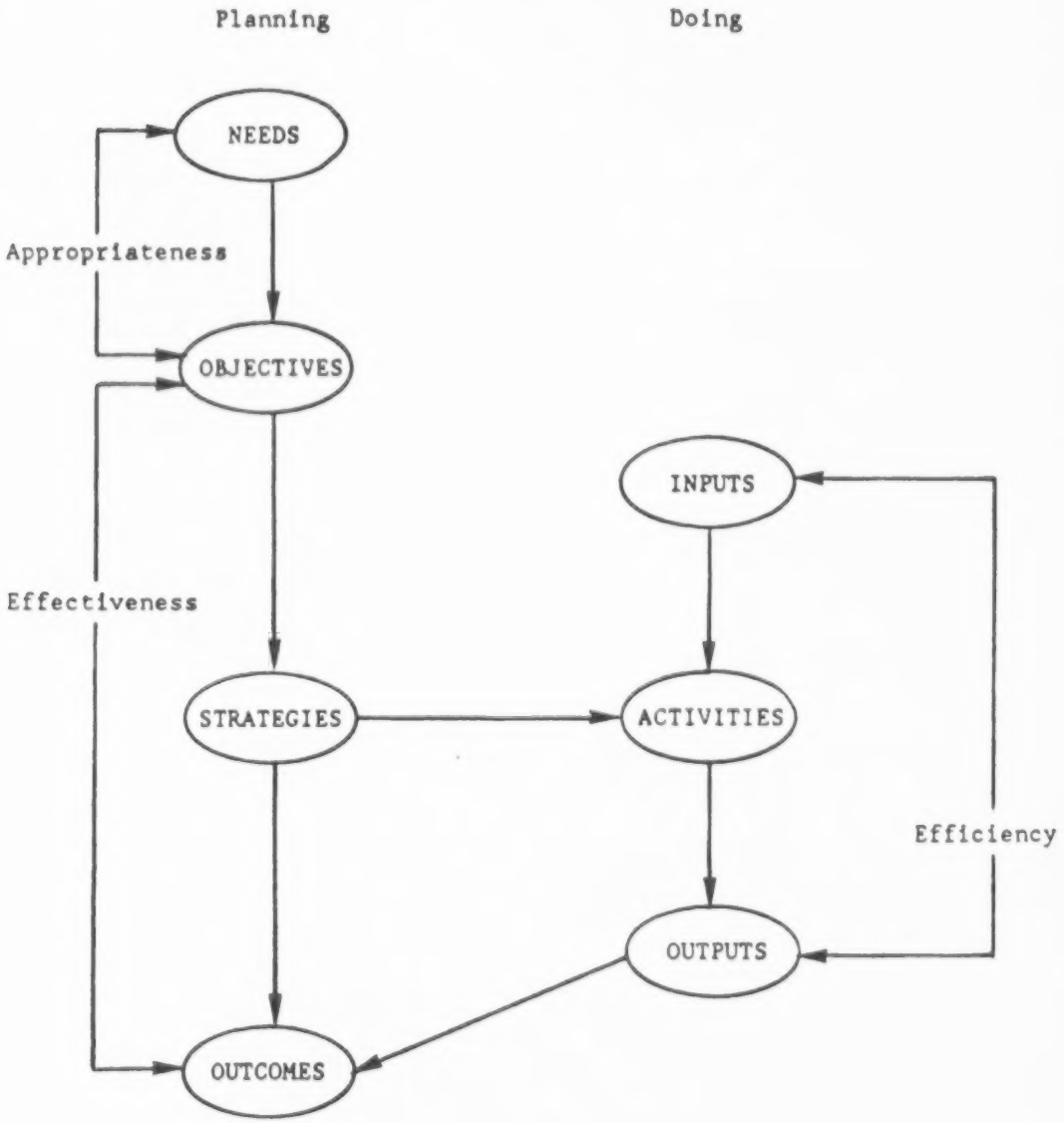


Figure 3